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# Sport Diver

THE JOURNAL OF SPORT DIVING

VOL. 2 / SECOND QUARTER 78



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Florida's East Coast

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# Sport Diver

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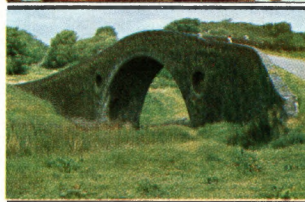
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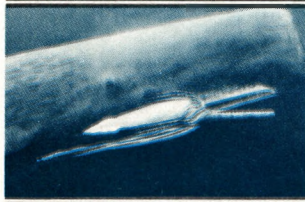
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COVER: With the proper equipment this lionfish and a unique coral head become colorful subjects for the cinematographer. Photograph by Carl Roessler.



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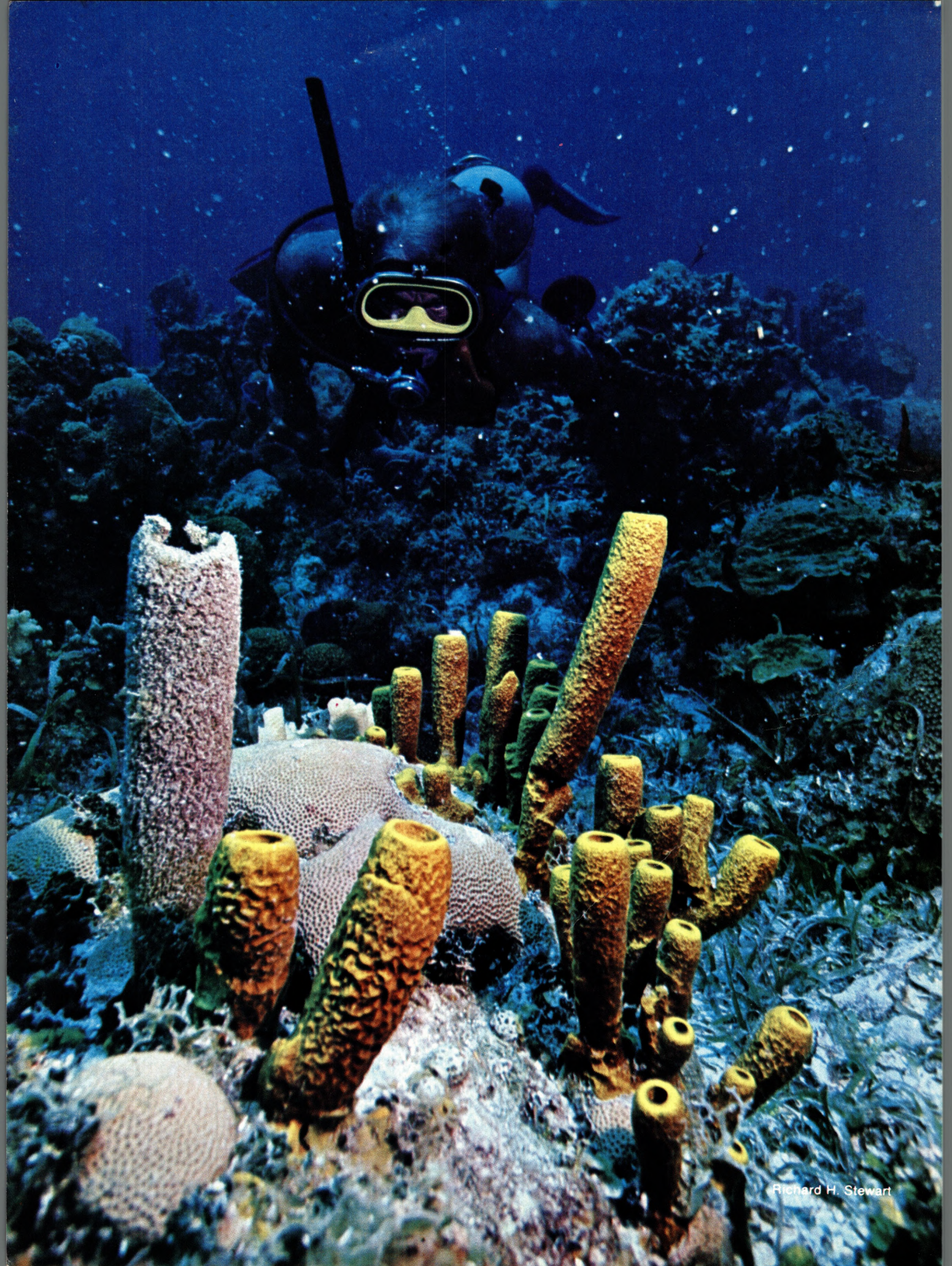


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Richard H. Stewart



# Editorial

## FROM THE PUBLISHER

Our first anniversary issue (V2, Q2) is at last unveiled displaying a firm editorial direction and consistency of design. Overall we're extremely happy with *Sport Diver's* growth and the quality of this issue. With over a year and a half of blood and sweat efforts, *Sport Diver* has earned an undisputed reputation as the world's most colorful diving publication — and the largest in editorial content.

The 1978 season was recently launched with the successful DEMA (Diving Equipment Manufacturers Association) trade show held in Miami, Florida. Several thousand participants — owners, managers, and store personnel — swarmed through the display floor reviewing, discussing and purchasing new stock for the forthcoming spring/summer season. And although this show is closed to the general public — it has been suggested that the show offer at least one of its five days for a public open house — it does begin a new year of film festivals and club sponsored activities such as Chicago's Our World Underwater; the treasure hunt held in Toronto and Hollywood, Florida each year, the California Dive-In and so much

more. We strongly urge you to participate in these programs; they are the best outlets available to the sport diver for better understanding the inner world and our sport, as well as being exciting, educational and fun.

As a regular editorial subject the staff of *Sport Diver* Magazine puts forth a special and sincere effort to inform its readers with the happenings and progress of the sea ecology movement. These subjects are consistently published under our Seacology and Controversea departments. It is our hope that such articles will enlighten those who are truly interested in our world ecology problems. Hopefully exposure and protest can reduce or prevent such actions as the recent massacre of dolphins by Japanese fishermen, Soviet whale annihilation, U.S. industrial pollution and the overall disrespect of sea creatures by man.

We find it unfortunate that many people are so caught up with their own fast-pace problems that a simple telegram to the proper government agency or representative is just too much trouble. No, your voice alone will not win this confrontation by the ecology-minded people, but

combined with those for a thousand others the message stands a good chance of being heard. But, in spite of all these ecology obstacles, the sport of diving and those who are continuously turned on to the sea are growing at a world wide rate of some 400,000 per year. As civilization progresses our dependency on the seas will become clearer; perhaps then we will manage the resource more wisely and begin a very exciting and incredible era in human history. So, enjoy your sport — for the seas belong to you!



Kathy S. Bentley

RH Stewart



# LETTERS

Dear Sport Diver:

I was interested to read the letters objecting to the cover photo on your first issue. I, too, found it offensive, but didn't bother to write. Having now read the other objecting letters and the replies, I write in the hope of adding some light to the controversy.

We who object to your cover do not mean to single you out for criticism. We also object to the use of sexually attractive women to sell cars, stereo equipment, beer, et cetera. Both (Rick) Frehsee and (Kathy) Bentley accept without question the practice of using women to attract attention. But ever-growing numbers of prospective customers of all ages, both men and women, are reacting negatively to the cheesecake style of advertising when it is irrelevant to the product. Responsive ad agencies are developing and producing alternative styles. Surely the underwater world is rich enough in potential camera subjects that you need not resort to cheesecake in order to "entertain people visually".

You will appeal to a wider cross section of people if you avoid styles which offend members of your target audience. Maybe you can't please everyone, but you surely ought to try not to offend.

**Marilyn Johnson, Ph.D.**

**Cabrini College, Pennsylvania**

*We could produce a magazine which wouldn't offend anyone and it would probably have the style and consistency of homogenized cream cheese. Sport Diver will continue to publish controversial material. If it offends some of our readers, we're sorry.*

Dear Sport Diver:

I have much enjoyed your first two issues of *Sport Diver*. Your magazine is refreshing, I would compare it with the very early issues of *Skin Diver*. I was amused by the letters to the editor over the cover on Volume 1, Number 1 (I loved it). I am an active diver at 36 and still like pretty girls, keep it up.

I would like to see more articles on foreign and far away diving, lots of color photos (which you are doing), and limited on the very technical. Make it Fun, Flashy, and Exciting — that's what the best diving is all about, and what the best sport diving magazine should be about. And don't sacrifice your quality for a publishing date.

**Gary Cruea**

**Issaquah, Washington**

Sport Diver

Dear Sport Diver:

I just received your third issue today, and as usual, the first thing I did was open it to the Letters department. Ever since your first issue I have been following with interest the subject of Ms. Gains, who appeared on the cover of that issue. Well, they did it again.

I just read a letter in your latest from a Ms. Dilger in Cincinnati. To quote Ms. Dilger "... your pictures of Ms. Gains are pure, unadulterated and unjustifiable exploitation." If I can stop laughing I should be able to finish this letter. Perhaps poor Ms. Dilger did not notice the cover of your second issue, in which Ms. Gains was sufficiently covered by a wet suit, BC, and what have you. Maybe she would like to see a man in a bikini on one of your covers. I thought the cover of your first issue was great, but then again I'm a man.

I also like the way Ms. Dilger's letter appears on the bottom right corner of page 48, and your advertisement for the first issue appears on the following page, directly across from her letter. That-a-way, *Sport Diver*!

I have read all three of your issues cover to cover, and will continue looking forward to upcoming issues. As for Ms. Dilger, well, welcome to the world of Sport Diving.

**Garrett L. Wharton**

**Windsor, Ontario, Canada**

Dear Sport Diver,

I have just received the Volume 2, First Quarter '78 of your magazine, and I am outraged by the picture of the nude female eel on your cover. I am sure that you would never use a photograph of a similarly unclad male eel.

This is clearly a cheap and crass attempt to use an eelcake photograph to sell your magazine. No self-respecting eel would be seen with such a piece of shrimp-like jewelry on her thorax, as this would destroy her streamlined shape and make her unseaworthy as well as tacky. I assure you that female eels are safe and conscientious eels and not just pretty bodies. One more cheap shot like that and I will cancel Mr. Earley's shutterfinger!

**Marie D. Eel**

**Kneejerk, Idaho**

*Kneejerk, Idaho?*

Dear Sport Diver,

I am a Clinical Associate at the Student Health Service of the University of Florida. We see many students who are skin and scuba divers with perforated eardrums. How soon after a perforation heals can these students resume diving? I

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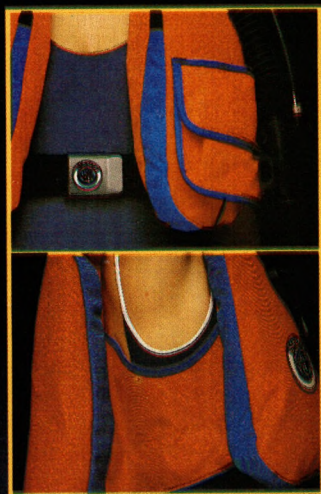




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## ATTENTION INTERNATIONAL READERS

We sincerely hope that our readers outside of the U.S. enjoy the contents of *Sport Diver* Magazine. *Sport Diver* is truly international in its design and format, and we especially encourage contributors who can submit articles or news releases on diving activities around the world.

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# LETTERS

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found your article on hearing loss and the diver to be very informative, but it did not answer this question. It stated there was a possibility that a diver with a perforation should never dive again, and I was wondering how this was determined.

**Carol Ann Hricz, R.N.**  
**Gainesville, Florida**

*The determination of when and whether a diver should resume diving after suffering a perforated eardrum should be made only by a physician who specializes in treatment of ear disorders.*

Dear *Sport Diver*,

As per the commentaries mentioned in your second issue, your kind attention would be highly appreciated in covering the Pacific region and Asia also. There are many regions in this part of northeast Asia worth mentioning, but are still not covered by world-reputed magazines such as yours. Such regions not only include Japan and Okinawa, but parts of Taiwan, Korea, Philippines, Thailand, Malaysia, and as most people know, Micronesia. May I look forward to seeing articles in your magazine about this part of the world; also you will find here an abundance of marine life, including poisonous sea urchins, and also an abundance of interesting ways of preparing seafood. Thank you and may I look forward to hearing from you soon.

**Charles Yoshida, M.S.**  
**PADI Instructor 2852N**  
**Japan**

Dear *Sport Diver*,

Your new column, Washington Currents by Phil Trupp, is excellent. Divers need and must know the legislative processes that may aid, but usually hinders them. The bringing together of legislators, divers, and the general public can only bring a common understanding with the resulting benefit to all. About the item "Uncle Sam May Need You", add us to your list of volunteers. We would be happy to help.

**Armand Zigahn**  
**President, Scuba Sport Rites Club**  
**Rye, New York**

*Thanks Armand. If more scuba clubs would get involved with Federal programs, perhaps we might see some more positive legislation coming from Washington. Check out the open letter from Senator Weicker on page 124 of this issue.*

Dear *Sport Diver*,

Last summer I took lessons and received my certification as an open water diver. One of the things I'm still trying to get over since I'm really but fledging diver, is the fear and paranoia of the underwater world. Don't get me wrong, I love diving the encounters I've had while exploring the azure paradise; it's just sometimes I may run into a plant or animal that I've never seen before and it's kind of hard to approach it without having feelings of being the "main course".

Books, TV shows, and especially magazines like *Sport Diver* really help beginners to understand the ocean; the dangers and the wonders, as seen through the eyes and cameras of experienced divers. I must congratulate *Sport Diver* for its fine articles and spectacular photographs, because, as one thumbs through the magazine, the fear of the sea ebbs away and the "explorer" in all of us begins to bust out and want to go diving.

Since I live in California I'd like to ask *Sport Diver* to publish more articles on cold water diving, especially kelp diving, and of all the strange yet wonderful things encountered in the area of Ft. Bragg, Mendicino, Monterey, etc.

Finally, I'd like to thank my instructor, David Cassotta, who recently opened a shop in Rocklin, California, for introducing me to the world of sport diving, and for having the taste to sell your magazine in his store. I humbly ask that you publish this letter because it means a lot to me and others.

**Alfredo Ortiz**  
**Rocklin, California**

Dear *Sport Diver*,

Your new magazine is beautiful. I haven't been diving in about a month now (my gills are getting dry) and your magazine is just perfect for the times I couldn't dive. It lets my imagination flow and dream about diving in tropical or far off places.

I'm a cold water diver and it's really great to see and read articles about warm water diving. What I'd like to see is the continuation of cold water diving articles in your magazine. I would also like to see an article on the Puget Sound octopus, my favorite salt water creature.

I really like the way you cut down on advertisement space and use it for articles. You're also the only diving magazine I know of that uses practically, if not all, color photographs in your issues. It is beautiful! Keep on putting them out!

**Karl Mueller**  
**Birmingham, Washington**

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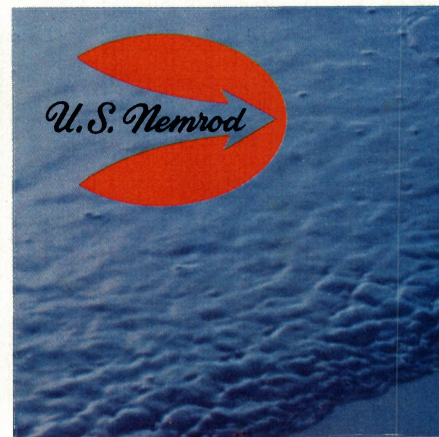


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## LETTERS

continued from page 8

Dear *Sport Diver*,

I am involved with a certain amount of commercial diving, this being on various parts of San Francisco Bay. I was wondering if you might possibly consider doing a test on the full face and helmets available for attaching to a scuba tank. Being bothered by sinus infections and such can seriously hinder a diver's health, and thus he cannot be a dependable diver. I believe U.S. Diver has this equipment and there is an excellent model made in France, but information is scarce, no less a reliable comparison report.

I'm sure other divers would be happy to consider such an instrument if they can find such a unit and its advantages.

**Deb "Do It" Balston**  
**San Rafael, California**

*Sport Diver* does not publish comparative test reports. The information you want would best be picked first hand from manufacturers and commercial divers.

Dear *Sport Diver*,

My wife and I have been diving a little less than a year. Our school, Gene Aqua Pro Shop, located on Lake Tenkiller in Oklahoma, is one of the best. It's an active dive shop, well stocked and with the friendliest people you've ever dealt with. Not only do they instruct, but they show you what there is to enjoy in the great down under. Only one thing seems to be missing from basic scuba instruction: CPR, Cardio Pulmonary Resuscitation! During instruction we were taught proper equipment use, survival, and everything else we could possibly use except what to do if an emergency situation arises where CPR or mouth to mouth resuscitation would be required. This seems like a very basic skill for people who are constantly around water and vacation spots where the out-of-shape American is likely to be overdoing it, taking chances, etc.

We are attending a CPR course at a local hospital as both of us feel it is our responsibility to know what to do. We also think that it would be great if the certification agencies would include CPR in their basic courses. Everyone seems to be trying to make diving safer with the addition of BC's, CPG's, multi-level certification and so forth. Shouldn't CPR be added to the skills list?

**John and Merelyn Aubrey**  
**Fort Smith, Arkansas**

Dear *Sport Diver*,

Thank you for reviewing my latest book, *Foraging Along the California Coast*.

I did notice a minor oversight, however, that I would like to correct. In the review it was mentioned that I advocated harpooning sharks for fun, which was contrary to the conservation stressed throughout the book. Also, the reviewer stated that sharks were inedible.

Nothing could be further from the truth. In the opening anecdote, I stated "I had killed another fish in the sea, not because it too was a killer, but because it was one of the best eating fish of all." Moreover, there are several shark recipes at the end of the chapter.

I pointed this out because the entire thrust of the text was aimed at educating the public to use our marine resources wisely and conservatively — a goal that I'm sure *Sport Diver* endorses also. My whole intent was to avoid the great white hunter approach, and instead, to consider the sea as a marine orchard that will continue to yield her bounty only if harvested carefully. I hope everyone will understand my concern and learn to share this respect for the sea. Our legacy to future generations will be decided by our actions today.

**Peter C. Howorth**  
**Santa Barbara, California**

*We'll adjust our eyeglasses Peter. Your text was indeed educational and explained clearly the regulations governing the taking of marine organisms.*

Dear *Sport Diver*,

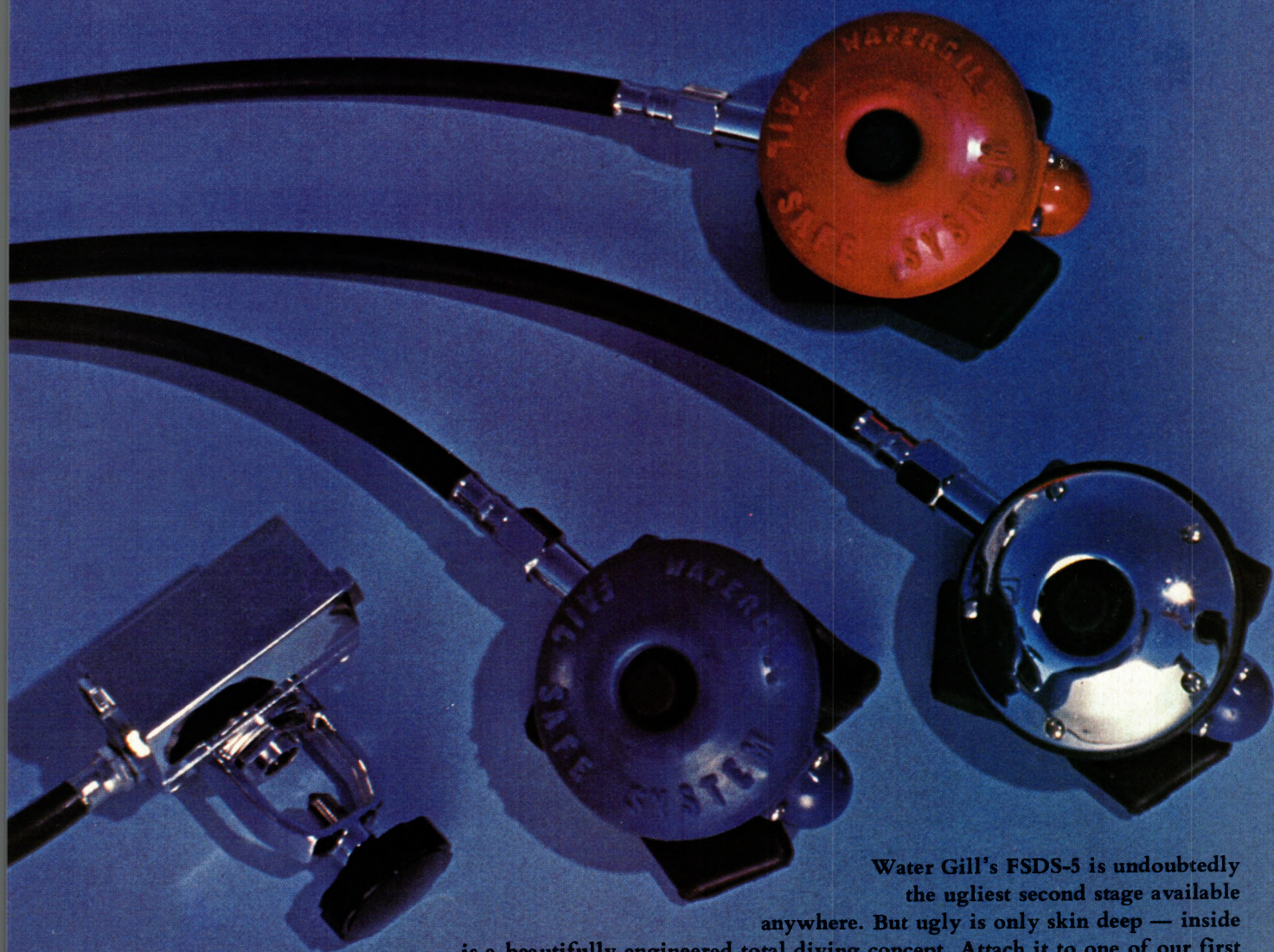
It is with considerable interest that I examined the first issue of *Sport Diver*. The magazine holds considerable promise. The photography is indeed gorgeous, and at least in Volume 1, the articles do not seem to be dominated by manufacturers.

I would like to offer a pair of criticisms which I hope will be accepted as constructive: 1) For the sake of those of us unfamiliar with specific locations and marine life displayed, it would be very helpful if the photographs were more fully captioned. I see no reason why any attractive photograph should not also be informative. 2) A diver's appreciation in diving, and indeed his or her health may very well be affected by what he/she reads in *Sport Diver*. For this reason I feel that confused pieces of writing such as "A Hyperbaric Chamber" should not be included in your otherwise fine magazine. The supposed diagram of nitrogen saturating the body cells is one example of

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# THE HIDDEN SECRETS OF THE AWESOME ELEUTHERA WALL

Text and Photography  
by Bob Wallace



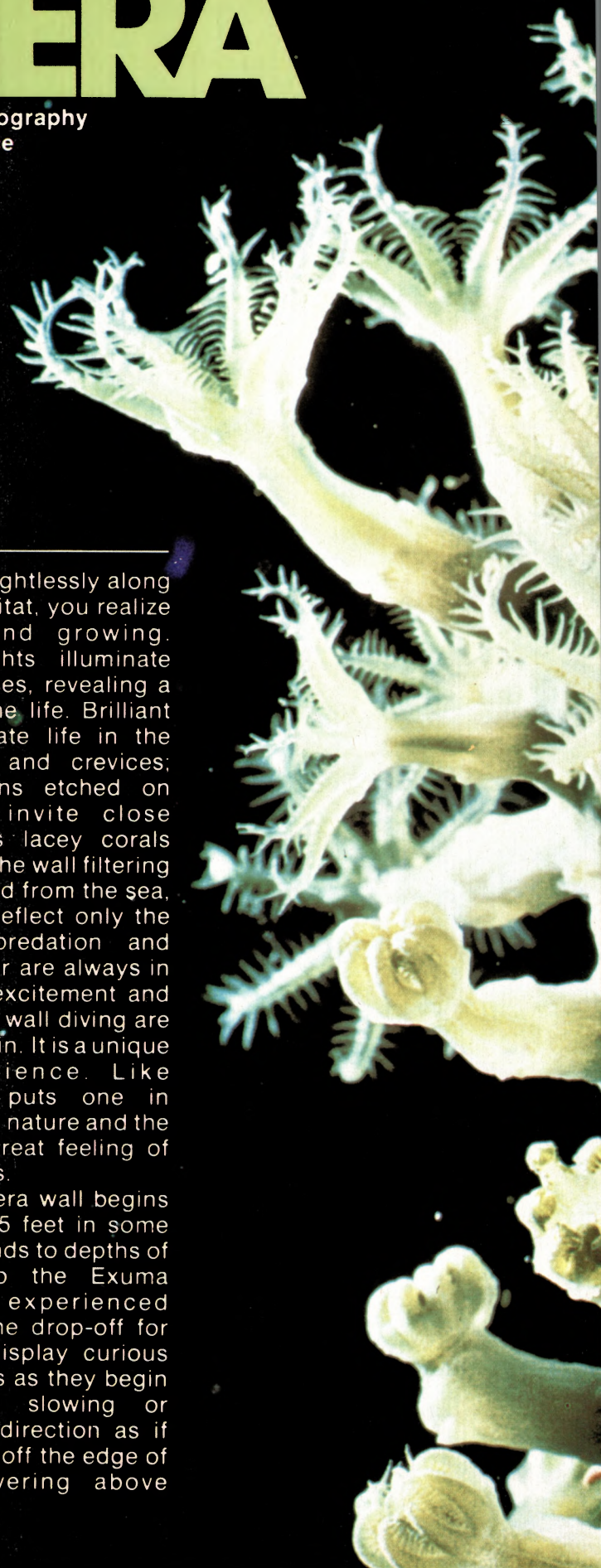
If Robert Frost had been an accomplished sport diver as well as America's poet laureate, he would never have written those famous lines, "something there is that doesn't love a wall." For unlike the New England stone fences that inspired that epithet, here is a wall that nature continues to build and nurture, rather than tear down.

Innerspace reveals some of nature's most beautifully choreographed scenery. The most overwhelming of these seascapes is a vertical coral wall, recently discovered off the south end of Eleuthera, in the Bahamas. This awesome drop-off remains largely unexplored, for much of the wall lies in unprotected waters requiring almost no current to safely explore her depths. Minutes from the Cape Eleuthera Marina, this spectacular ledge is one of the most impressive diving areas in the Caribbean.

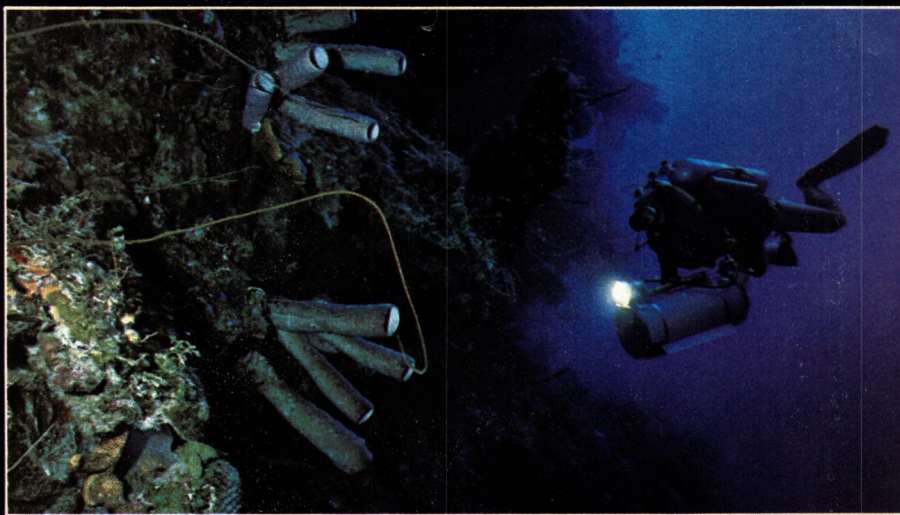
Sport Diver

Gliding weightlessly along this vertical habitat, you realize it is alive and growing. Underwater lights illuminate shadowy recesses, revealing a variety of marine life. Brilliant colors accentuate life in the ledges, caves, and crevices; intricate patterns etched on huge corals invite close observation. As lacey corals reach out from the wall filtering microscopic food from the sea, time seems to reflect only the present, yet predation and survival behavior are always in evidence. The excitement and the addiction to wall diving are difficult to explain. It is a unique diving experience. Like meditating, it puts one in perspective with nature and the universe — a great feeling of calmness results.

The Eleuthera wall begins as shallow as 55 feet in some places. It descends to depths of 2,000 feet into the Exuma Sound. Even experienced divers seeing the drop-off for the first time display curious swimming antics as they begin to back-pedal, slowing or reversing their direction as if they fear falling off the edge of the wall. Hovering above





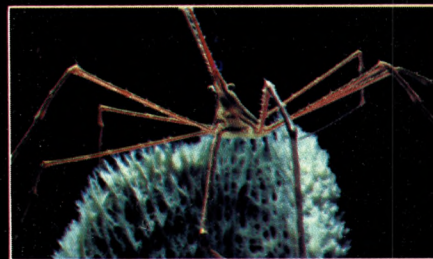
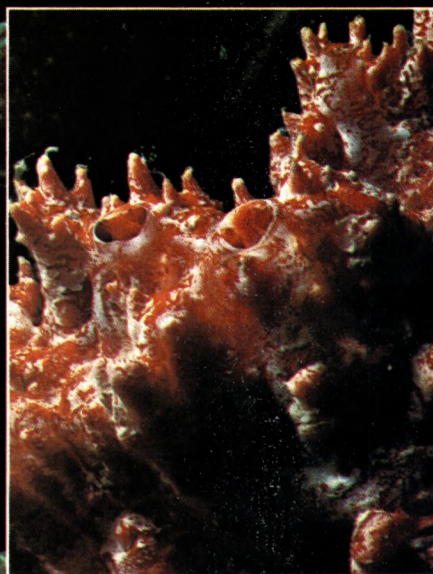


luxuriant coral gardens, the ocean bottom abruptly disappears, rewarding the adventurer with a breathtaking view into the clear, midnight blue abyss below.

Garfield McCartney, my close friend and diving partner for many years, is dive master at the Cape Eleuthera Resort, a resort renowned as the finest in the out islands. The million-dollar marina from which Garfield operates his dive shop and dive boats is one of the most popular ports of call in the Caribbean; and well it should

be, for much of the superbly prepared seafood is caught by Garfield and served that evening in one of the most elegant restaurants in the out islands. During a recent assignment for *Sport Diver Magazine*, we planned several day and night dives to new areas along the wall.

Garfield is an Open Water Instructor with PADI working towards PADI's Master Diver's rating. Together we have explored blue holes, a subterranean lake, deep ocean caves and logged some of the most exciting night dives I have ever experienced. Night diving on the wall is the ultimate diving adventure. Night visitors to the vertical reef may find puffer fish, which, inflated, will hover in dark space like satellites in orbit; octopi displaying a kaleidoscope of color changes to confuse their enemies;







*The delicate yet hardy species that inhabit the Eleuthera Wall exist in a continuing cycle of build up and decline. As the corals and sponges are continually growing, they are continually diminished by predators. The view at left shows some of the interior passages of a sponge which, simple-looking to the eye, is a complex and fascinating organism.*

schools of squid, eyes glowing, reflecting the artificial light which attracted them; and lobsters, much larger and less timid than their shallow, reef-dwelling relatives, keeping their enemies at a safe distance.

Nature defies symmetry, especially underwater. I became aware of the simple fact, when, on a leisurely exploration of the vast crevasses that scar the rim of the wall I discovered the most unusual coral outcropping I have ever seen. In the blue mist, 175 feet away, a gigantic jewel encrusted necklace was pulled taut against the ledge as it trailed off into the fathomless depths of Exuma Sound. "What the hell is that?" one of our dive partners, Jim Fleming, scrawled on his slate. I replied with a quizzical expression and Garfield, Jim and I cautiously approached the weird formation as if to assure ourselves that it was not a nitrogen apparition. It wasn't. It wasn't Neptune's necklace either, although it would have made a fitting one. Upon close, and I mean close, examination, we finally determined that our "natural marine phenomena" was a submerged cable that in the years since its intrusion had become a toe hold for hundreds of diverse colonies of coral. They eventually enveloped the tempered steel like multi-

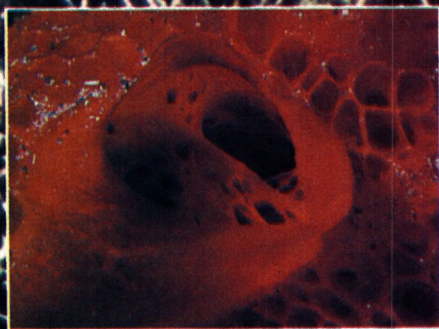
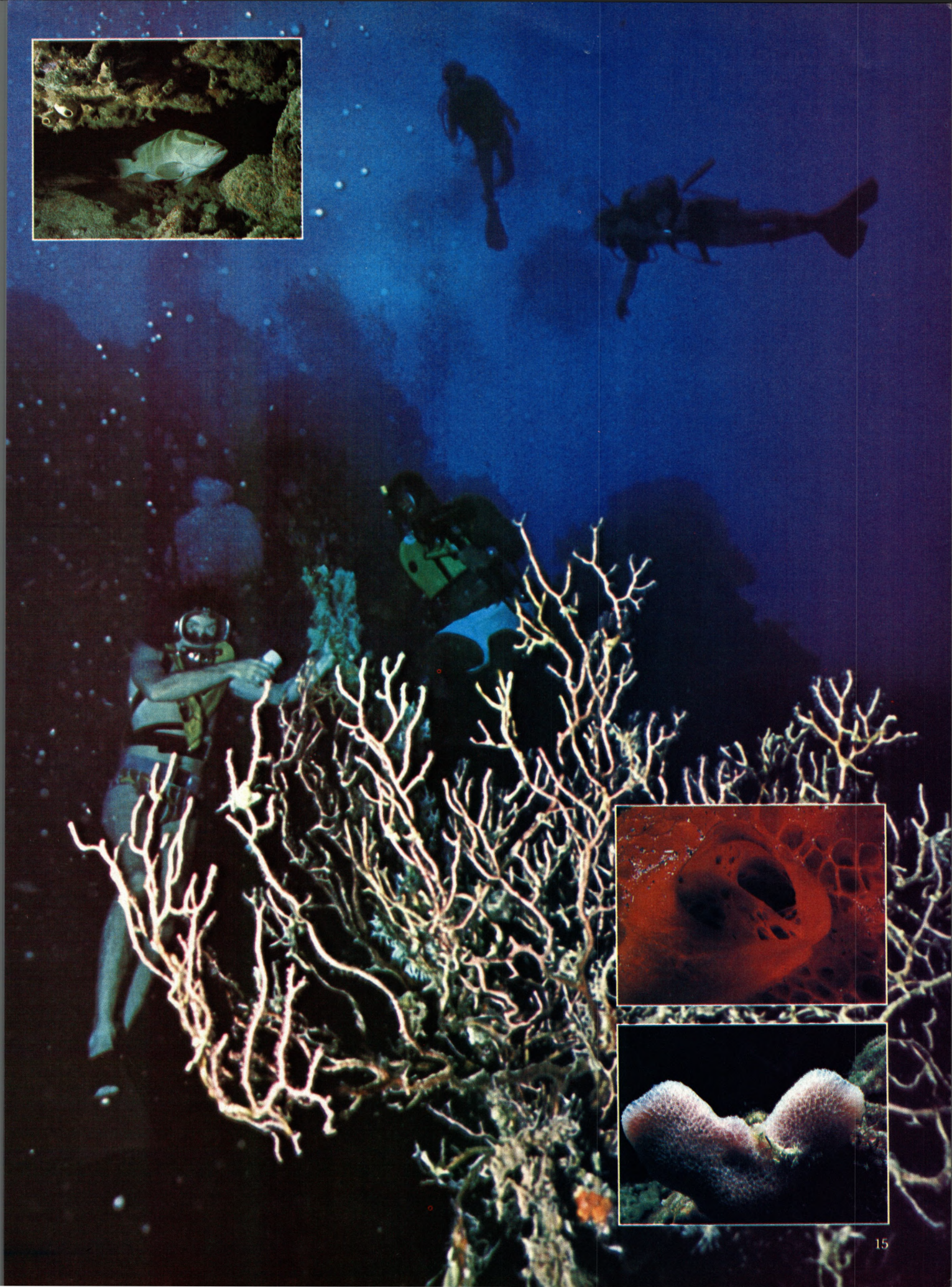
colored vegetables on an Arabian shish kebab. Along the cable beneath us black coral erupted from a lacey network of gnarled and twisted aquatic fingers. Strobes flashed and cycled, ready for the next shot. For a brief moment in this timeless world man, driven by his curiosity, had witnessed another secret. Investigation later disclosed the reason for the cable's mysterious location. It was placed there by the Navy for sonar testing during World War II. After completing a dive off Cape Eleuthera last summer a group of divers were startled by the sudden appearance of a submarine surfacing nearby; another story to be added to the long list of adventures in these enchanting waters.

Although massive and eerie, the Eleuthera Wall supports a fragile ecosystem. Plate corals reach over ten feet in diameter, groupers, weighing in excess of 100 pounds, can be found in caves or just lumbering effortlessly along the wall. In areas where spearfishing is permitted, these century-old giants are leery and scarce. Spearfishing is restricted by law in the Bahamas, allowing only Hawaiian slings to be used and only while free-diving.

The natural enemies of living coral are perpetually devouring living coral tissue. Some of these enemies include











crustaceans (copepods, curipedes, crabs), annelid worms, gastropod mollusks and fish. Defensively, coral feeding mechanisms also demonstrate the animal's efficient predation system. Extending its polyps, usually at night, the feeding activity begins. Equipped with small, spring-loaded cells called nematocysts, the polyps snare prey with whip-like tentacles trapping small critters.

Another population of strange animals brilliantly decorates the Eleuthera Wall in a gallery of colors. Sponges (*Phylum-Porefera*), are unique in the animal kingdom. This lowest form of multi-celled animal has been in existence since the Paleozoic era. Fossil remains of the sponge spicules (skeletons), are the only evidence of the earliest sponges. In prehistoric time, sponges were so abundant that the spicule remains formed some of the flint beds. Primitive men later used the flint to make fire.

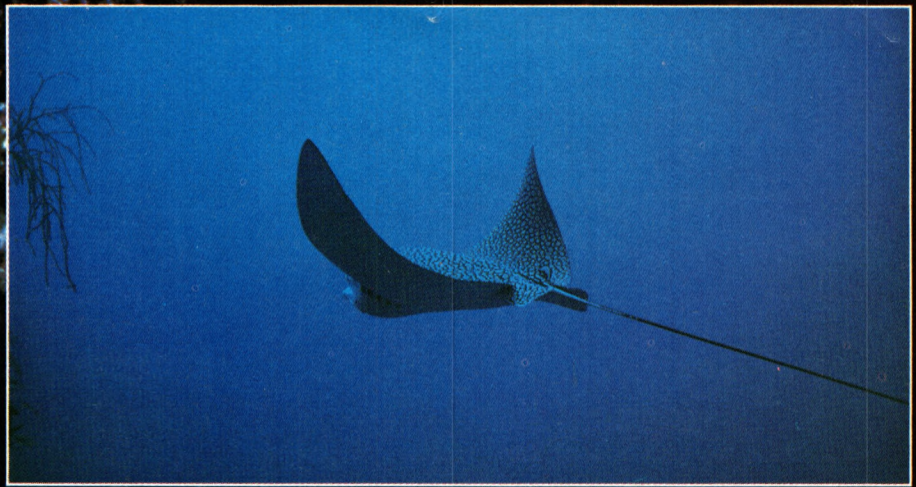
Little is known about the age of sponges. Some of the largest specimens in deeper waters may have lived for hundreds of years, others may live for only a year or less. Sponges have been brought up from depths as great as 8,000 meters (26,000 feet). Along the Eleuthera Wall giant sponges are nourished by the organic nutrients in the water. Food,

including algae, bacteria, and organic detritus, enters through microscopic pores; (porocytes) is passed through the interior cavities of the sponge. Tiny inhabitants occupy the pore spaces among the sponge fibers, living out their life cycle in the liquid mass within the sponge. Polychaetes, copepods, shrimp and numerous other small organisms reside in the complex canal system

within its body walls. The same current which brings food and oxygen to the cells, also carries the sperm from one sponge to the egg of another. This cross-fertilization is the most common method of fertilization in the animal kingdom.

Black coral grows on the Eleuthera Wall at depths starting at 80 feet. It is usually found deep in the tropical oceans of the world, and few



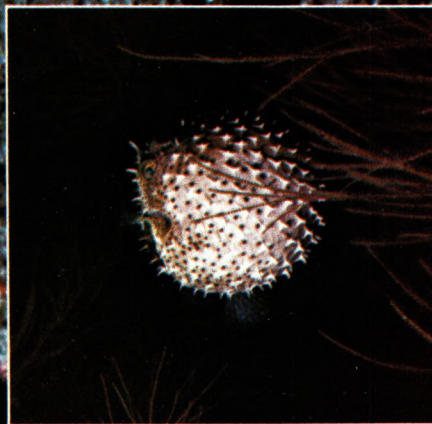


people have seen black coral in its natural state. The rarity and relative inaccessability tend to enhance its value; black coral commands a high price when polished and made into jewelry. Black coral trees reaching lengths of more than eight feet have been found at depths below 250 feet along the wall. In its natural habitat, black coral bears little resemblance to the

polished finished product, looking more like a dead tree with a light mossy covering usually gray or rust colored.

The coral tree is actually a colony of living animals. It is built up in layers, and only the top layer comes from plankton. Black coral (*Alcenarian*) is the closest relative to sea fans and sea whips. Not classified like true coral, it is like a hard wood. Highly polished, black coral has the deep luster of ebony and inky blackness of onyx. It is known as "king's coral" in India; in ancient times it had been used to make scepters. Black coral may be counted among the ocean's treasures. New laws forbid the taking of coral in many areas, resulting in a black market operation. In Eleuthera

continued page 20

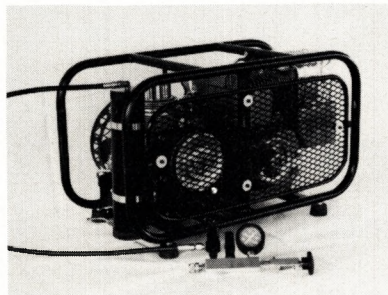




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# LETTERS

continued from page 10

what I presume is well-intentioned confusion (aseptic bonochrosis indeed). This sort of inaccuracy appears throughout the article and renders it at best confusing. As I have previously stated, *Sport Diver* shows considerable promise, and I trust that it will continue to improve and expand with future issues.

**William D. Waddington**  
Kent, Washington

The diagram in "A Hyperbaric Chamber" was confusing, as was the typographic error which changed "aseptic bone necrosis" to "aseptic bonochrosis". The balance of the article correctly describes hyperbaric chambers and therapy.

Dear Sport Diver,

It has come to our attention that your Spring 1977 issue includes an article entitled "Hydrotesting, The Final Flex" by Steve Matheny. This article contains two very serious errors which could lead to the return to service of cylinders which have failed the test.

The first error is the line at the top of page 21: "Should some error occur during testing, a retest can be made by adding ten per cent to the test pressure and then retesting." Section 173.34 (e) (4) of the Hazardous Materials Regulations of the DOT states "If, due to failure of the test apparatus, the test pressure cannot be maintained, the test may be repeated at a pressure increased by ten per cent or 100 psi, whichever is the lower value."

The second error is further along on page 21 where Matheny states that the rejection limit for aluminum cylinders is twelve per cent permanent expansion. The twelve per cent limit applies only to DOT-4E cylinders. Most aluminum scuba cylinders are built to DOT Exemption

(Special Permit) 6498. The rejection limit required by the Exemption is ten per cent. Attached is a copy of a Bureau summary of retest requirements which apply to these cylinders.

**R. M. Graziano**  
Director, Association of American  
Railroads  
Washington, D. C.

Mr. Matheny says you're right.

Dear Sport Diver,

I am writing in regard to your article "Can Diving Hurt Your Hearing?". I am one of the lucky few who has a perforated eardrum. The problem is I don't want to give up diving. I love the sport, have a big investment in equipment, and am a NAUI Assistant Instructor, planning to become an instructor.

My local dive shop has informed me that many persons still dive after perforating their eardrums and that there is a hood (Scuba Queen Air Hood) on the market that I can use. My doctor informs me that the hole in my eardrum will probably not heal.

I enjoy your magazine. Too bad this article didn't come out 100 dives ago.

**Christine Davis**  
Peoria, Illinois

Dear Sport Diver,

Here I sit in a Miami hotel waiting for proper identification to come through the mails so I can take off for the Caribbean islands. In the interim I have visited two dive shops, trying to get adequate information on diving spots on the islands, but to no avail. No one seems to know anything. I came from northern California assuming this info would be readily available in Miami.

Your Summer '77 issue had a nice article on Haiti, which I plan to make my first stop. Since I am not a certified diver, the article inspired me to get my certificate there. If at all possible could you in a future issue give more extensive info on locations of dive facilities, prices for instruction, tours, and what not? Or inform me of a book or guide available that lists such locations?

Thank you for your help and interest.

**Robert Swetlik**  
Chico, California

Writing to the addresses listed at the end of each of our travel stories should produce the information you need to plan a trip.

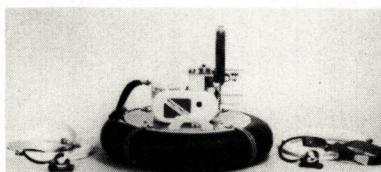
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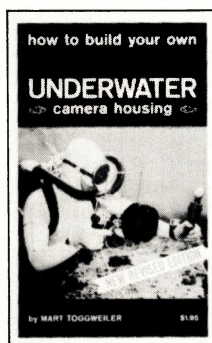
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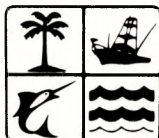
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## ELEUTHERA WALL

*continued from page 17*

and throughout the Caribbean, strict enforcement by resort owners and divemasters insures that black coral and countless other beautiful corals will remain in the sea to be enjoyed by divers from around the world.

The coral wall is one of the most colorful communities in existence. A concern for the continued preservation of the Eleuthera Wall has resulted in a conservation effort to protect this new underwater attraction so that it will suffer no harmful effects from divers. A plan is presently under way to establish the Eleuthera Wall as a Bahamian National Park area. Although the deeper areas may never be seen by sport divers, a special environment will be preserved for exploration, when technology and increased knowledge permit deeper and longer visits into the sea.

An island of mystical heritage; a free land of rural, agrarian life, Eleuthera provides a life of dignity for the Bahamian men and women who harvest the land and the sea — and a unique atmosphere for visiting sport divers.

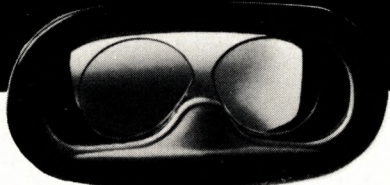
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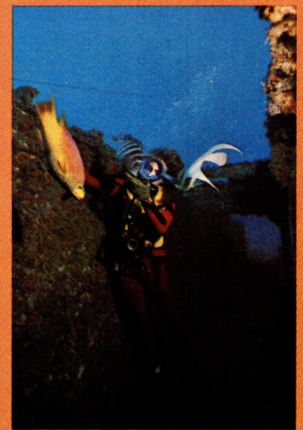


# *Florida's East Coast*

STORY AND PHOTOGRAPHY BY  
**JOHN LARSEN**



*The sheer number of species found off Palm Beach is overwhelming; they represent most of the aquatic life present in the Caribbean with some species more characteristic of northern waters thrown in the measure. The octopus, center, has been known as the devilfish to seamen and shoreside dwellers for centuries, but today it is sought by divers eager for a peek at this mysterious invertebrate. While octopuses are very shy fish on the artificial reef seek out divers, curiously sniffing about the BC pockets looking for a handout. Sunk nine years ago to form a*



Along Florida's east coast from Jacksonville to Miami there are a number of excellent dive sites. Shallow and deep reefs, wrecks and artificial reefs all add to the underwater scene; but nowhere along the coast is there such a concentration of good diving as is found just off Palm Beach. Here an easy boat ride from the dock can place you on a wide variety of coral reefs, one of three good wrecks, or, if the sea is rough, in the protected ship channel. Abundant fish and marine life can be found at any of Palm Beach's good sites, and except for a few species of fish and corals, are the same as you would find in the Bahamas, Caribbean or the Florida Keys.

The whole area from Jupiter to Lake Worth is referred to as Palm Beach diving, although less than half the area is actually offshore from the town of Palm Beach. Within this area there is a great difference between the reefs north of Palm Beach Inlet and those to the south. This diversity is a result of the conflicting influences of the warm Gulf Stream and the colder waters just north of the inlet.

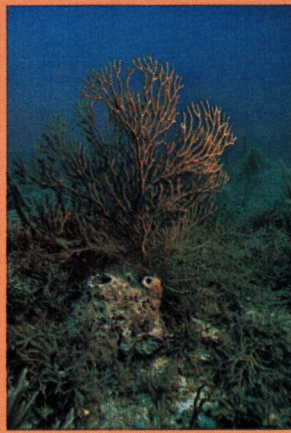
The northern reefs towards Jupiter, which are generally deeper, have formed around rocky ledges that teem with fish, and along the outside of these reefs is a deep ledge that begins in 110 feet and drops rapidly to 160 feet. Drift diving along the ledge at 130 feet you come to a huge yawning cave that exits inside the ledge at the top of the reef. Usually there are large grouper, jewfish and sharks in the cave, so it's a dive for the experienced only. There are several ledges closer to shore that range from 60 to 90 feet deep, and fishing or lobster hunting along them can be quite rewarding.

Several miles south of Palm Beach Inlet there are two major reef tracks, one in 15 to 25 feet and one in 80 feet of water. Shallower than the northern ledges, these generally have more coral and gorgonians and less current, making them ideal for underwater photography. Near Lake Worth the reef is very typical of what you would expect to find much farther south in clearer water.

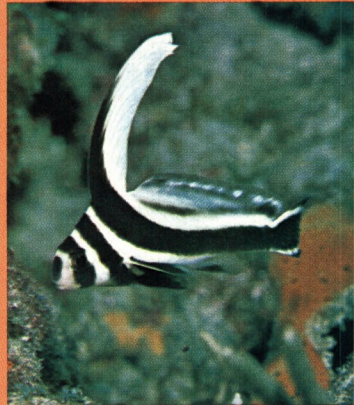
If the ocean is too rough to dive the reefs or ledges, a dive in Palm Beach Inlet can provide a good time along with abundant fish life and good shelling. As a result of the dredging that created the ship channel there is a ledge that starts at about 10 feet and drops off sharply to 40 feet. Visibility







*fish sanctuary, the Mispah, Amaryllis and PC are favored dive sites despite strong currents. The currents can be a problem if you're not prepared, but with a little foreknowledge they can be used to hitch a ride, drift diving over acres of reef on a single tank. The result is an incredible trip for photographer and lobster-hunter alike. The ledges north of Palm Beach Inlet are well stocked with bugs and the reefs to the south display the corals and gorgonians that make underwater photography worthwhile.*



can be 60 feet at high tide and it's a great place to teach night dive techniques.

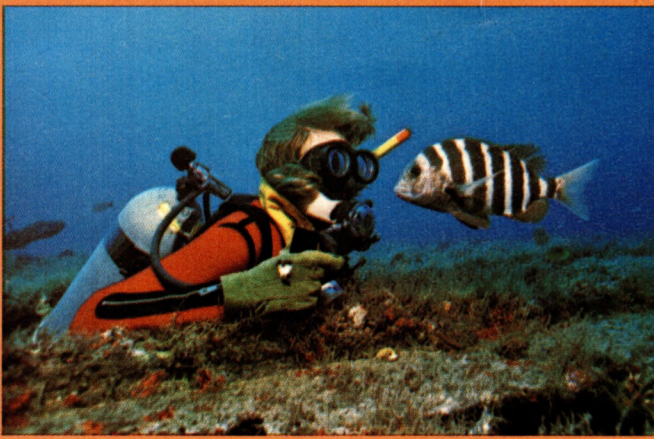
In addition to the expanses of natural reef, there is also an artificial reef. Sunk intentionally about nine years ago, the *Mispah*, *Amaryllis*, and *PC* (patrol craft) now provide sanctuary for schools of snappers and grunts just one and a half miles from the inlet. Thousands of fish swim over the wrecks, seemingly secure in the knowledge that both state and county laws prohibit spearfishing and collecting here. Although a dive light is helpful, these boats can be explored without ever leaving the ambient light, and while cruising the passageways you're likely to encounter large amberjack or jewfish patrolling the decks. The fish are tame enough to hand feed, and this coupled with the 40 to 100 foot visibility can produce a lot of satisfying pictures.

Like many other portions of the underwater world, the reefs off Palm Beach can present several problems to the unprepared diver. Along the deeper reefs there is a maverick current that can run from nothing to three knots. It usually flows north, but has been known to flow south on occasion. While the Gulf Stream, which always flows north, is the major influence on Palm Beach currents, eddies, counter currents, wind currents and tidal flow combine to form currents that cannot be predicted before reaching the dive site and which can vary with the time of day or even during a dive.

Preparation for any dive off Palm Beach should include plans for the current. One method for safe current diving is to drift dive, reducing the chances that you'll be separated from your boat. Divers enter the water at the same time from a boat that is drifting with the current. The group leader controls the dive, carrying a float line with a buoy attached to one end and a small anchor to the other. Divers stay together, drifting with the current until someone wants to stop. A signal is given, the anchor secured, and everyone stays with the float line until a signal is given to move on. Drifting is effortless; an exhilarating experience, flying over a mile or more of reef on a single tank, and it's a great way to hunt for lobster or sight-see. The boat follows the buoy attached to the leader's float line and picks up divers as they surface along this line.







When currents are weak or non-existent the entire dive can be spent at one location. After the boat is anchored, the divers enter the water holding a line which is secured to the main anchor line. Once in the water they pull themselves along it to the anchor line, then go hand over hand to the bottom. On the bottom the divers should remain in sight of the anchor line or proceed up current. If the buddy team should have to surface, a quick ride back to the boat via the current is assured.

The variety and excellence of Palm Beach's diving alone place it among the very best sites on the east coast; coupled with its convenience to a major metropolitan center (75 miles to Miami) and the resulting lower transportation costs, Palm Beach emerges as one of the premier diving areas in North America. Wrecks and reefs, drift diving and near-tropical visibility have given many divers an experience they won't soon forget, and one many of them have repeated again and again. 🐡





## IOF HURRICANE OPENS

The world's first indoor hurricane, complete with shrieking winds, lightning flashes, thunder and pounding rain is now open at Planet Ocean in Miami, Florida.

"Our Weather Engine theme area will bring visitors as close as they'd ever want to get to a real hurricane," said Dr. F.G. Walton Smith, director of the non-profit marine science attraction.

Entering the theme area, visitors see three large radarscopes. Each shows the hurricane drawing closer and closer to Miami. Emergency weather warnings from the National Hurricane Center are issued continuously.

The visitors enter a tunnel with reinforced plate glass windows. Through these, the full fury of the hurricane is revealed. Wind and rain pelt the windows, the darkness is split by intermittent lightning and the howling winds fill the room. A gauge shows wind velocity at 100 m.p.h. while a barometer records rapidly sinking barometric pressure.

With the hurricane safely past, visitors enter a theater where an audiovisual presentation illustrates how winds are set in motion. Computer animation is used to explain how energy is transferred from sea to sky, and how the climate may be controlled.

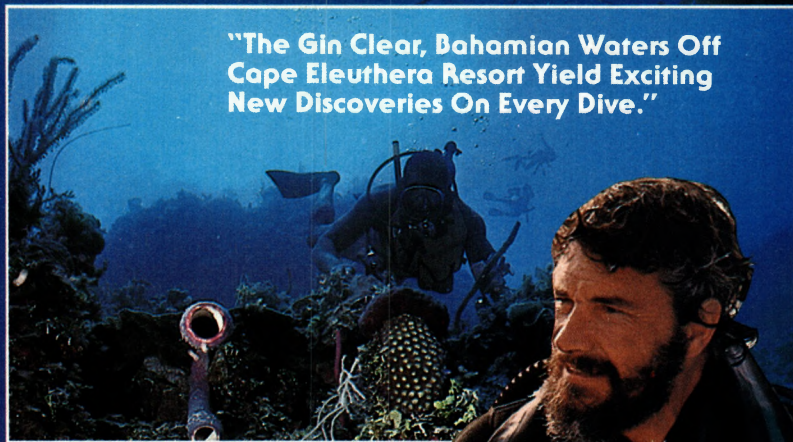
Planet Ocean, Miami's newest attraction, is dedicated to exploring and explaining the mysteries of the world's oceans. The 100,000-square-foot facility is the home of the International Oceanographic Foundation, a non-profit scientific and educational organization that owns and operates Planet Ocean.

Other ocean experiences at the attraction include the South's largest iceberg, an indoor cloud and rainstorm, a submarine that can be explored from the inside, a high seas ship listening station and much more.

In addition to Planet Ocean, the IOF funds numerous investigative science projects, organizes exploratory expeditions and maintains marine science laboratories for use by scientists.

The IOF also collects and publishes recent research and information on topics of general interest in its magazine, *Sea Secrets*. *Sea Secrets* also publishes a great deal of very fine underwater photography, both by members of the IOF staff and by regular contributors.

Many of these IOF activities are supported through the donations of individuals and groups and by income from the Planet Ocean attraction on Rickenbacker Causeway. Admission is \$3.50 for adults and \$1.75 for children six to twelve years old.



**"The Gin Clear, Bahamian Waters Off Cape Eleuthera Resort Yield Exciting New Discoveries On Every Dive."**

*— Bob Wallace, internationally known underwater explorer, photographer and lecturer*

Bob Wallace is typical of the serious divers who keep coming back to Cape Eleuthera. Here, in his own words, is why, after nearly 100 undersea adventures on our reefs, he still considers them to be an exciting challenge.

"On my wide ranging photographic assignments, I have logged hundreds of hours at diving resorts throughout the world. Frankly, none can compare with Cape Eleuthera for the quality of topside facilities and services and the amazing variety of marine life and diving and underwater photographic opportunities directly offshore.

"Whether you're snorkeling in a cove where the conchs are as thick as cobblestones, or gliding through a staghorn jungle in 30' of incredibly clear water, or hovering over the rim of the awesome Eleuthera wall, Cape Eleuthera will be a place that lures you back again and again. For divers especially, one of their ads says it best. 'You'll know how much you loved Cape Eleuthera when it breaks your heart to leave.'"

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# PROJECT OCEAN SEARCH . . .

J-M Cousteau and you

Story by Steve Blount  
Photographs courtesy of the  
Jean-Michel Cousteau Institute

**S**unup finds a becalmed *Calypso* resting easy at her anchorage. The time could be summer vacation, Christmas, or Easter and spring break; in the tropic sea life aboard *Calypso* does not vary by the season. Diving in the Mediterranean, exploration and adventure are dreams for most boys, but for Jean-Michel Cousteau they were part of a rich home life he shared with his brother Philippe, his mother, and his father, Jacques. Like the rest of the family, he's most at ease when near water; talking in his second-floor office he is personable and direct describing the role and direction of the new Jean-Michel Cousteau Institute. Yet later as we walk along the banks of Skull Creek taking in fresh South Carolina sunshine reflecting off the briny tidewater inlet, his boyhood dreams come to life in impassioned inflections of his voice and quick hand movements.

FRANCOIS R. BRENOT



Each year Jean-Michel Cousteau (right) leads Project Ocean Search expeditions to study and experience ecologically sensitive environments. Below left, divers assist professional researchers conducting a coral study project. At right, Jean-Michel and POS divers gear up. There are many opportunities to dive during each of the programs, and numerous activities for non-divers as well.

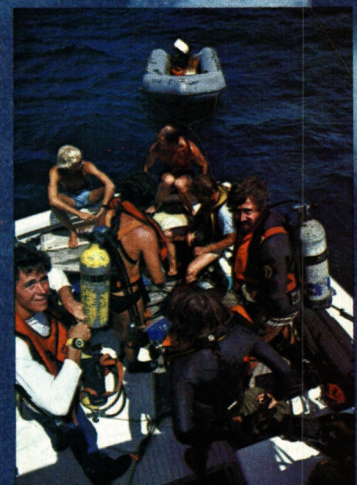


ANN-MARIE COUSTEAU

RICHARD MURPHY



ANN-MARIE COUSTEAU







Participants identify and observe indigenous species (left) while a marine toxicologist examines a poisonous Pacific cone shell.



RICHARD MURPHY

SACHA

## PROJECT OCEAN SEARCH . . .

"When I was very young I wanted to become a marine architect to design underwater habitats because I believed that many people would live underwater. I became an architect and studied the problems of submarine dwellings. It convinced me that man would never live beneath the sea for long periods of time. It is too expensive and the aquanaut must be in very good shape physically, so it's impractical. I also was interested in top-of-ocean structures so I helped design a floating island that could relieve some of the population pressure from places like Monaco and Hong Kong that have no land for expansion."

Although the underwater habitats were impractical and the island was never built, many of Jean-Michel's other dreams did materialize. He helped plan and build the museum aboard the *Queen Mary*, now docked permanently in California. His behind-the-scenes contributions to the *Calypso* expeditions and programs like "*The Undersea World of Jacques Cousteau*" writing, editing film and hassling with a millin post-production headaches have done much to further the singular message that is his passion: Man must live in harmony with his environment, preserve and protect it if our species is to survive.

It was while working on the *Calypso* that Jean-Michel began receiving requests from all types of people asking if there was any way they could participate in the *Calypso* projects. There wasn't but remembering what the childhood voyages of discovery had done for him, Jean-Michel set out to create a series of programs in oceanography that could involve anyone, regardless of age or background, with the environment. In 1972 Project Ocean Search was launched by Jean-Michel and Francois Brenot. They took a group of participants to the Channel Islands off southern California and spent a week studying the ecosystem. The result was almost magical, an instant community, an incredibly strong fraternal bond between the expedition members and Jean-Michel and Francois. And for these two the future was plain, more Project Ocean Searches in more places.

Five years have seen POS groups in the Caribbean, the Atlantic, the Channel Islands, and on Wuvulu, a remote island in the Bismarck Archipelago south of New Guinea. For each group there is time to explore an island's complex relationship with the sea, to identify and observe animals and fish, and to dive with and know Jean-Michel Cousteau; his determination and his commitment to preservation. Participants are of all ages, teens and grandparents and come from every possible walk of life; students, housewives, plumbers and Ph.D's. There is a lot of diving connected with the projects, but it's not necessary to be a diver to join. The only prerequisite is a deep concern and curiosity about the world and how it works.

Last year, to enlarge and coordinate POS and to facilitate some other projects, Jean-Michel set up the Jean-Michel Cousteau Institute, a public non-profit foundation dedicated to the well-being of mankind and

to the protection of the environment. With help from Francois, who is Executive Director, and the Sea Pines Plantation, the Institute was established on Hilton Head, a sea island off the South Carolina coast. Jean-Michel was attracted by the pristine and sensitive marshland environment; because it is surviving in the face of increasing development he sees it as a test for the successful co-existence of urban utilization and a fragile ecosystem. Through the foresight and concern of the Sea Pines Plantation, developers of Hilton Head, the Institute has received financial assistance, a tract of waterfront land for a headquarters, and a building.

Jean-Michel hopes to use these resources to better educate us. Already the Institute has produced films for this purpose and a television series is underway. The library will collect and distribute audiovisual programs, educational material and research data. Of course more POS programs are part of the plan. This year Jean-Michel will host programs on Hilton head; Antigua and Barbuda or the Gulf of Honduras; Santa Catalina off of southern California; and Wuvulu. As always the participants will live in close contact with Jean-Michel and the environment, and can receive academic credit through the University of Southern California or conduct independent research.

If you're tired of the yearly resort shuffle, can you picture a vacation that lets you really contribute something to what we know about sensitive ecosystems? Maybe ten days on a sea island, or ten days on Santa Catalina studying the kelp forests, or three weeks in the Gulf of Honduras experimenting with sponges and corals? How about a full month on Wuvulu observing people who have not yet been contaminated by the industrial society and their coral atoll home? This plus the company of a sensitive oceanographer adds up to a summertime experience that could rearrange your head and your priorities. Former POS participants describe the experience as a re-evaluation of man's role in nature, and feel so strongly about the program that they often identify themselves by project and date rather than name. At any of Jean-Michel's incessant lectures at least one person will come up, grab his hand and say "Remember me? Santa Catalina '75!" And he does remember, for each one is a part of his POS family.

There are still opportunities for you to join this family on a Project Ocean search this year. If you've got what it takes — curiosity and concern — write Francois Brenot for more information at The Jean-Michel Cousteau Institute, P.O. Drawer CC, Harbour Town, Hilton Head Island, South Carolina 29928. And send along a dollar with your letter for a reply; like many other worthwhile organizations, the Institute has an abundance of vision, but little ready cash. ☺



SACHA

Jean-Michel and Francois enjoy a feast with Wuvulu's chief (center). Interacting with a foreign culture and participating in the islanders' lifeways leaves a lasting mark on everyone who visits here.



SACHA



## Pregnant Divers

Is it safe for women to scuba during pregnancy? If a woman asks ten different doctors this question she will probably get ten different answers, none of which are substantiated with case histories of pregnant scuba divers. Factual information on the effects of scuba diving on the pregnant woman and the fetus is practically non-existent. Opinions which have been offered by diving physiologists are contradictory and based on studies of rats breathing hyperbaric oxygen and Japanese breath-hold divers. To date no research has been published on any studies of pregnant scuba divers.

Margie Bolton, a graduate student in nursing at the University of Florida and a senior advanced diver, is conducting a survey to collect information from women who have been pregnant since scuba certification and within the last five years. Women who dove during pregnancy will be compared to women who dove prior to, but not at any time during, pregnancy, for the purpose of describing and comparing diving and obstetric histories.

Questionnaires will be available June 1, 1978. Results of the study will be mailed to all participants and will be submitted for publication in diving and medical journals so as to inform the diving public and medical personnel of the findings.

If you are interested in participating in this study, obtaining more information or helping by distributing advertising handouts to your local dive stores, instructors, dive clubs and obstetricians please contact:

Margie Bolton  
3311 N.W. 30th Avenue  
Gainesville, Florida 32605

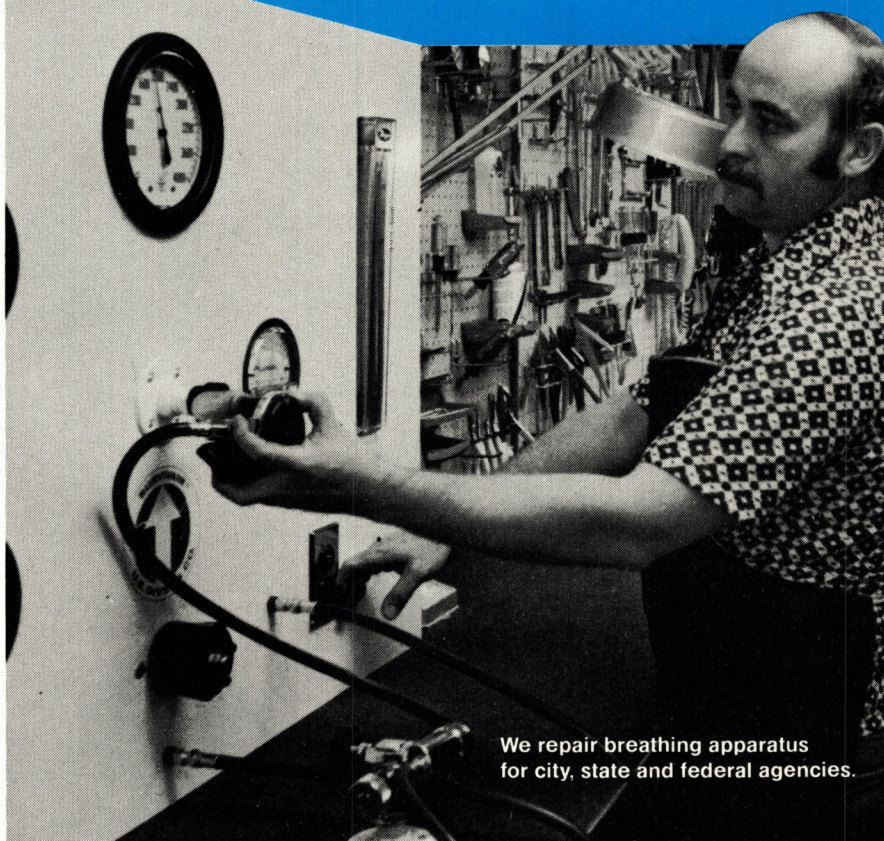
## Physicians Underwater Medicine Program

The Ninth International Physicians Underwater Medicine program will be held August 5-12 at the Underwater Explorers Society in the Lucayan Bay hotel on Grand Bahama. The academic program meets the requirements for 25 Category I Continuing Education Credits and is awaiting approval by the A.M.A.

Emphasis will be on practical aspects of recognition and prevention of diving casualties and emergency procedures for dealing with diving accidents.

Lee Turcotte's Atlantis Safaris of Miami Shores, Florida has arranged a complete diving program for the seminar through the Underwater Explorers Society and reef trips will be scheduled each day during nonlecture hours. Write PUMP, Box 530344, Miami, Florida 33153.

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# BENEATH THE SEA

*A Marine Guillotine*  
(*Odontodactylus scyllarus*)  
Photos and text by  
Ross G. Isaacs

Whether you dive cool southern waters of New Zealand, the warm waters of the Great Barrier Reef, or clouded estuaries, the unique and personally rewarding experience of discovering curious or bizarre organisms is one reason we spend much time, effort, and expense to pursue the hydrous environment which offers mystery and untold beauty in many forms.

There I was, concentrating for sometime on wiggling my little finger in front of a small moray eel to attract him out for that award winning shot with my Hasselblad, when something caught my attention through the corner of my mask. Ambling out from under a clump of hard coral like a miniature armored tank came a creature appearing to be a hybrid between a praying mantis and a shrimp. It is this appearance which labeled this organism with the common name mantis shrimp.

The mantis shrimp belongs to the same phylum as does the praying mantis, classifying it as an arthropod, but is more closely related to the shrimp, being a crustacean.

This pugnacious animal is well endowed with offensive and defensive appendages which it uses with great speed and agility. Mantis shrimp have two claws resembling the front legs of the praying mantis which are used to strike, clasp, kill, and tear apart prey such as small fish, shrimp, crabs, worms, and other mantis shrimp. This shrimp has an arsenal of spines and armor used as a defense against predators such as the octopus and cuttlefish (right), and for defending territory.

Mantis shrimp live in burrows, usually neatly

*continued page 52*









## DIVING ACCESSORIES FROM GLENN BEALL

### NIKONOS MOUNTING SYSTEM

A complete system for mounting Light Meter, Camera, Underwater Light. Lets you get it and keep it all together, topside and underwater. The ultimate in convenience and one-hand operation. Fits Nikonos II & III. Complete Mounting System & Shutter Trigger—#27HC8—\$49.50, plus \$1 ship and handl.



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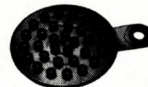
This handy little bracket fits around underwater pressure gauge hoses and holds underwater thermometers. Fits all small dial type thermometers and hoses up to 1/2" in diameter. \$3. Plus 50 cents ship & handl.



### THE OCTOPUS

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regulator. Kit price (1 Hose holder and 2 Hose Guards): \$8.50, plus 75 cents ship & handl.

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Illinois residents add 5% sales tax. • Send 50 cents for full catalog—refundable. Dealer inquiries invited.

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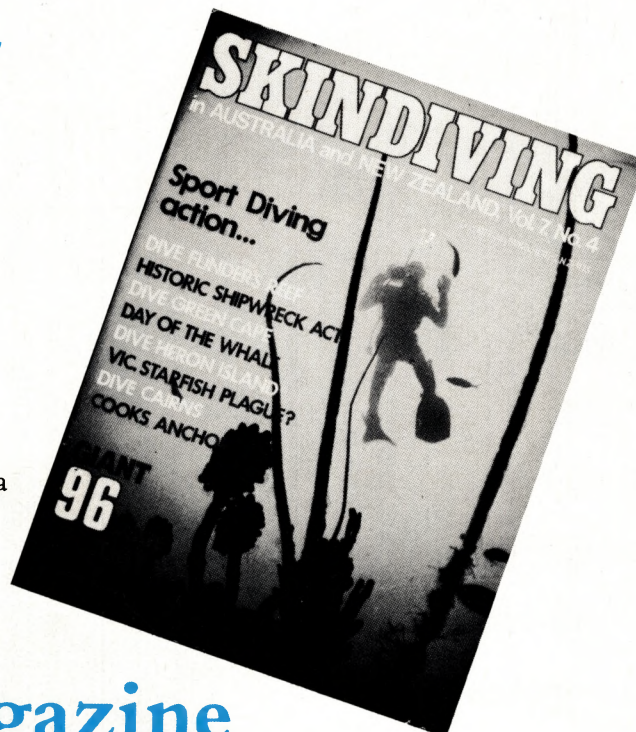
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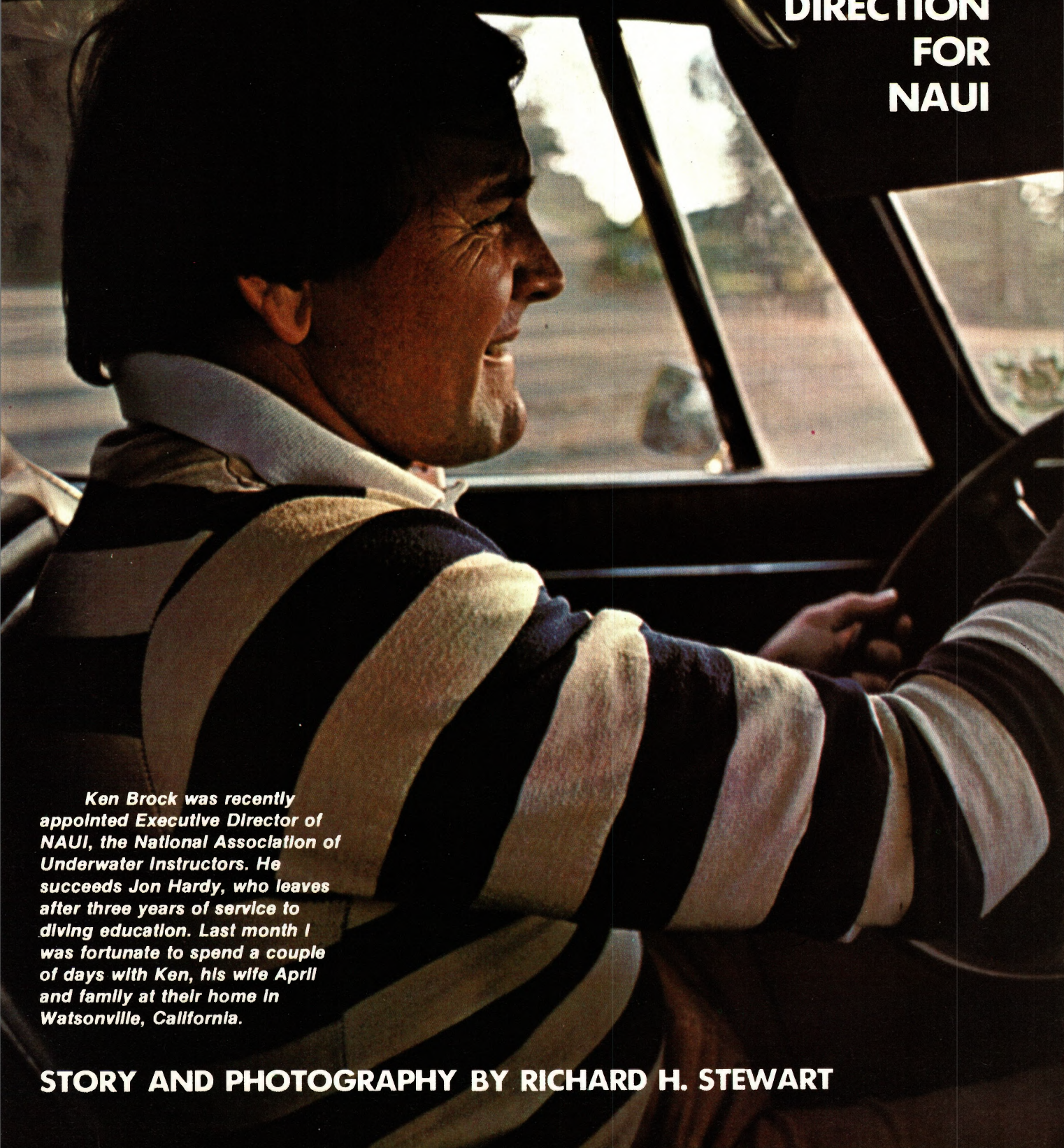


# Ken Brock

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**PROFILE**

**A NEW  
DIRECTION  
FOR  
NAUI**



*Ken Brock was recently appointed Executive Director of NAUI, the National Association of Underwater Instructors. He succeeds Jon Hardy, who leaves after three years of service to diving education. Last month I was fortunate to spend a couple of days with Ken, his wife April and family at their home in Watsonville, California.*

**STORY AND PHOTOGRAPHY BY RICHARD H. STEWART**



It seems most natural to picture Ken high in the mountains or on a long white sand beach where his sunny southern disposition is in harmony with the surroundings. No matter where or how many times you meet him though, the scene will be the same; his eyes crackle with pleasure and he'll grip your hand with a hello that could warm up even the most obstinate Scrooge, confident that you're going to like him. It's confidence that comes from experience. Will Rogers said he never met a man he didn't like; I think Ken hasn't met a man who didn't like him.

The instant ease and familiarity come from Ken's interest in other people, he thoroughly enjoys meeting and finding out about everybody. In fact, if you don't bring it up, you'll probably never find out he's NAUI's new Executive Director. You're more likely to get some conversation about Ken's wife, April and children Kelly, Tracy, and David on their last wilderness camping or diving trip.

Other things you may not find out are the accomplishments that preceded his appointment at NAUI. Ken was raised in Pensacola Florida; his first scuba dive was in Cherokee Sink near Wakulla in 1950. At Florida State University, he continued to pursue scuba, finishing up with a degree in physical education before moving to Mississippi to work with Art Aldrich as a YMCA physical director in 1960.

The job at YMCA was real good for a couple of years, but Ken wanted to taste life as a retailer, so he spent 1965 selling scuba gear from his store in Orlando, Florida. The vicissitudes of retailing and an offer from the YMCA sent him to Jacksonville, Florida as Director of Operations that same year. After three successful years there, he was moved to the Atlanta YMCA where he organized a complete watersports program in less than two years.

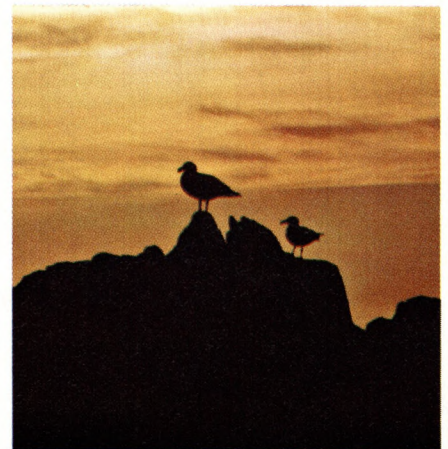


Although Ken and April were beginning to feel a little like they lived on the road, the next advancement was too good to turn down. From 1969 until 1972 Ken reorganized the Y's watersports facility in Freeport, Bahamas. In the islands, Ken's reputation grew as he strengthened and improved the YMCA program, so it wasn't a surprise when he was transferred to the YMCA Center for Underwater Activities, the national scuba headquarters. Ken went after his new assignment with the customary enthusiasm, producing organizational and innovative changes that were, in some cases, years ahead of the overall YMCA scuba effort. These innovations and experience eventually produced another assignment for Ken: National Director of the YMCA scuba program. During his tenure, Ken continued to streamline and modernize the YMCA's watersports activities, but then the national YMCA headquarters in New York asked him to uproot the entire scuba program and transfer it to New York. Being essentially southern at heart (born in Atlanta), Ken decided to resign as National Director to reorganize yet another YMCA, this time in Watsonville, California.

From Watsonville it was only a short step over to Colton when NAUI called to say there was room at the top in their organization after Jon Hardy decided to resign. Ken hopes to maintain NAUI's already

successful programs but add more emphasis on school/store support from headquarters and implement a more serious effort in the direction of underwater photographic education. As the direction in the diving community moves more towards special activities such as photography, Ken would like NAUI to be at the head of that movement.

In the 18 years Ken Brock has been in diving, the sport has gone through a number of major changes, and he learned to not only roll with them, but to influence, lead, and institute some of those changes. Still, there are times Ken wants to forget about flippers and wetsuits for a while. That's when he takes April, Tracy, Kelly and David, his ready-made exploration outfit, and heads for the hills. If you should meet him there, just extend your right hand and get ready; you're fixing to meet a hell of a nice guy.



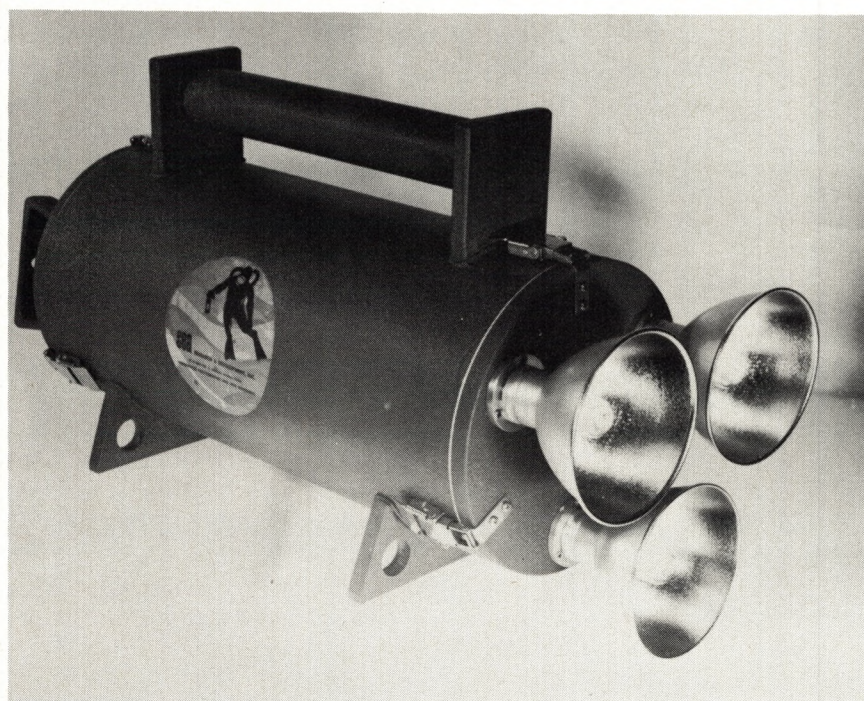
Ken Brock



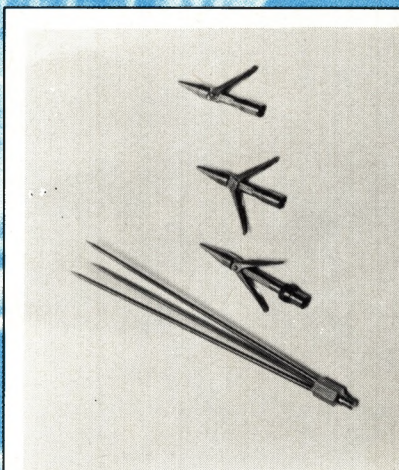
Ken Brock



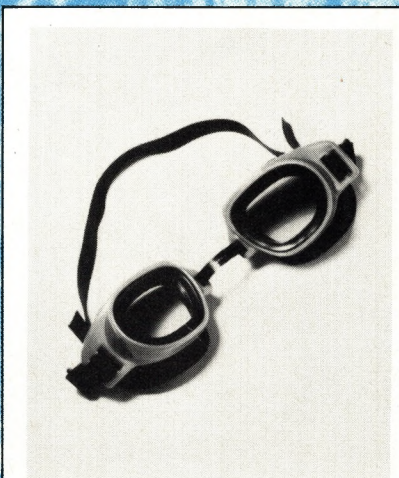
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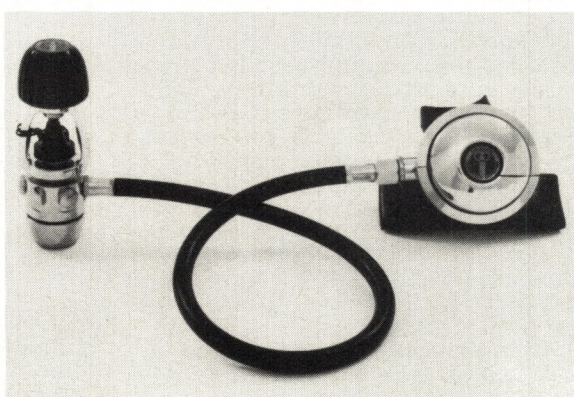


**HOUNDED BY INLAWS?** ... From Dacor, a new speartip with spreading tines. 10" long, the tines entrap fish ending unnecessary damage and tip unthreading. Stainless steel and brazed construction. Tip cover supplied. Dacor, 161 Northfield Rd., Northfield, IL 60093.



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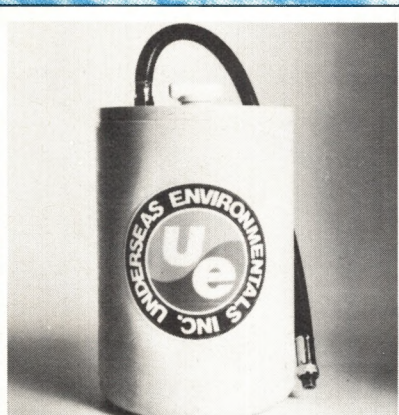




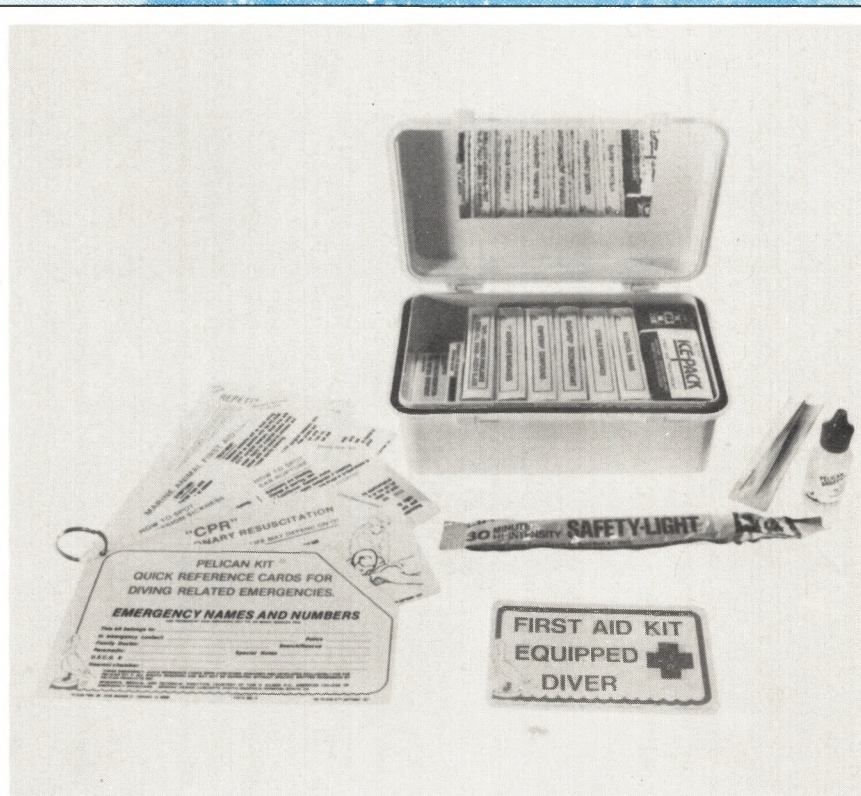
**NOW SPEAR THIS . . .** New pole spear from Sport Diver's Manufacturing has a smooth handling, molded grip, cocking detent, and sure-lock trigger. Disassembles for traveling, detachable tip. Sport Diver's Manufacturing, 1923 N.E. 150th St., Miami, FL 33181.



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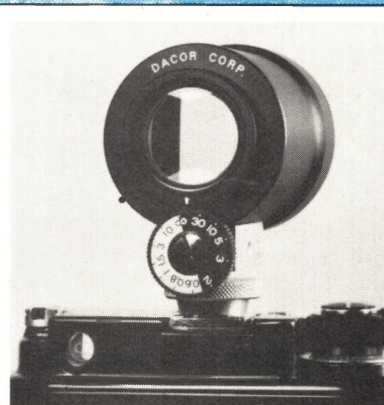


Full of hot air? Stay that way regardless of the water temperature with a Warm Air Breathing Apparatus from Underseas Environments, Inc. Fits easily to all existing air/gas tanks. Available from most dive shops, or order direct: Underseas Environments, Inc., 131 E. Redwood St., Baltimore, MD 21202.



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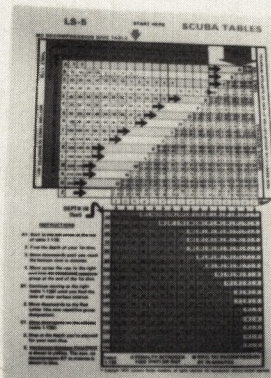
Sighting in, long a problem for underwater photographers, has finally met its match at the hands of Dacor's new optical finder. Featuring an indexed control knob that allows parallax adjustments, the viewfinder eliminates the all-too-common problem of mis-centered subjects due to mechanical framing problems. Simple to use with distance increments from two feet to infinity the finder mounts Nikonos cameras with ease. Unit will also fit underwater housings by use of a shoe mount. Three interchangeable masks supplied: a 28mm, a 35mm and a blank mask. From Dacor, 161 Northfield Rd., Northfield, IL 60093.



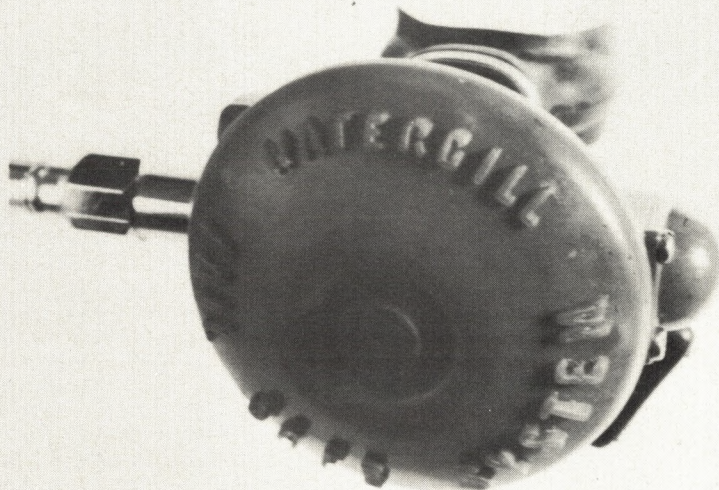




The Sea Box is a collection of nature's most beautiful and varied shells mounted between glass and framed in natural woods or metal. From The Great Seas Co., P.O. Box 20352, Tallahassee, FL 32304.



**NOT FOR THE COLOR-BLIND . . .** The LS-5 scuba tables are color coded to make dive planning and execution easier and plastic coated so they'll stand up to life at the bottom of your gear bag. Simplified, standard Navy decompression tables, also color coded, are on the back.

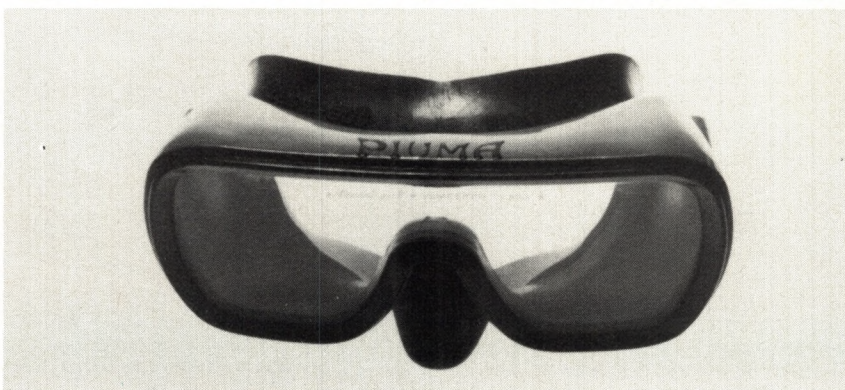


**IT WAS SO UGLY . . .** Watergill's new regulators are undeniably ugly, but breathe like a dream. They're available with plastic finish in blue or orange or with chrome cover. Watergill Underwater Innovators, 18100 S. Euclid, Fountain Valley, CA 92708.



**I'VE GOT A FEELING CALLED THE BLUES . . .** Farallon's popular Prismatic mask is now available in Oceanic Blue. Flashy and form-fitting, the new Prismatic is great for underwater photography and comfortable as well. Oceanic/Farallon, 1333 Old County Rd., Belmont, CA 94002.

The Piuma Mask by Cressi Sub is now available in Oceanic Blue exclusively from Oceanic/Farallon. The mask is light-weight, low volume with double seals for a sure fit and incredible comfort. Oceanic/Farallon, 1333 Old County Rd., Belmont, CA 94002.

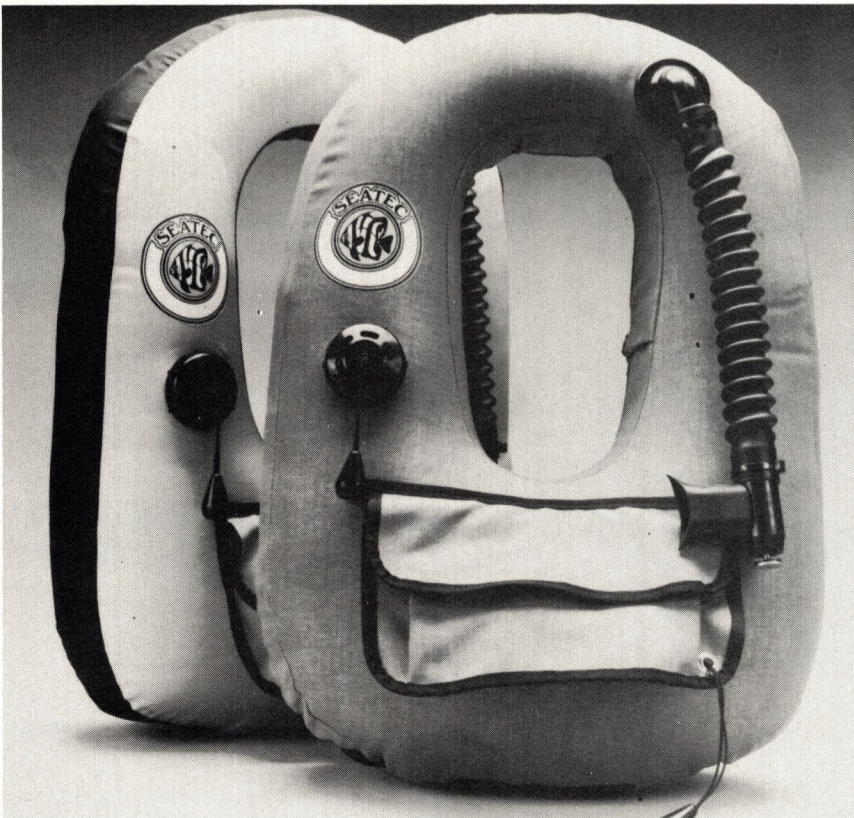




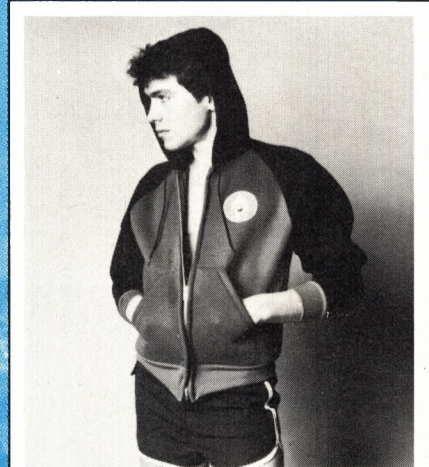
TRY OUR BLADE . . . guaranteed five more shaves than any other leading blade? Maybe - this new folding knife can cut it. Stainless steel blade with rosewood grips. Available from Dacor, 161 Northfield Rd., Northfield, IL.



*continued on page 43*



Offering a large oral inflator hose, CO2 detonator, spine and wrist straps, an automatic overpressure valve and a quick-dump override, Seatec's new small BC, The Puffer, has all of the features of our larger BCs without the bulk. Available in either "Tuff Tiger Threads" or urethane-coated nylon. Seatec Inflatable Systems, 425 W. Palmyra St., Orange, CA 92666.



LEFT OUT IN THE COLD? You won't be with this new hooded sweatshirt from Parkway. With an outer shell of 100% acrylic and an inner lining of nylon-bonded polyurethane, it is not only water repellent but warm as well. Parkway Fabricators, 241 Raritan St., South Amboy, NJ 00879.



Fitting close to the eyes for good visibility, these Nereida goggles provide protection from chlorinated or salt water. From U.S. Nemrod, 2315 Whitney Ave., Hamden, CT.

A departure from the ordinary, this new depth-recorder fish-finder from Shakespeare Marine Electronics offers the latest in space age technology. The Ultimate I employs a micro-processor data control center and thermal print dots instead of the familiar stylus-writer. From Shakespeare Marine Electronics, c/o 7600 SW 57 Ave., Miami, FL 33143.





# THE EDIBLE SEA

by Paul J. Hill

## In The Beginning FISH WAS RAW



There is no other animal that has more effect on diving and nutrition than the lowly fish. Fish get involved in most diving activities because they are everywhere, in almost every body of water, and because of their vast numbers, fish have had more effect on sustaining the world's population than any other animal. It has been said, "give a man a fish and he will eat for one day, but teach a man to fish and he will eat for a life time." I would add "if a man learns to eat raw fish, he can eat anytime, anywhere, even when shipwrecked."

There are records of shipwrecked fishermen in Mexico who survived for several weeks on the barren islands in the Sea of Cortez. One report was of a victim who got ashore in nothing but his shorts, but when rescued five weeks later, he had gained five pounds. His secret for obtaining water and food was raw fish, which he speared with a driftwood javelin. He didn't have to adjust to eating raw fish; one of the favorite foods of most fishing folks near the sea is ceviche (a raw fish dish).

It's no surprise to nutritionists that stranded seamen do so well eating raw

fish. They know that fish will provide the body with more nutrients than a porterhouse steak, raw or cooked; they are delicious, easily digested, and a welcome variation in anyone's meal plan. Fish, like most other seafoods, combine the high quality and complete protein unique to animal tissue with soft fats characteristic of vegetable fibre, and also contain useful amounts of minerals and vitamins. An average serving of fish furnishes more than enough animal protein to meet the daily requirements of the body, yet the fat content is very low. The small amount of fat in fish is unsaturated, easily digested, and is used readily by the body.

Men were eating uncooked seafood before recorded history, and fish bones have been found in the kitchen middens of nearly all ancient civilizations. Raw fish was part of the diet of the Athenian army of the fifth century B.C. During that time, Greek gourmets would pay huge sums for fresh fish; a small flask of fish could be traded for 100 sheep. Greek and Roman tastes for fish were so well developed that they could determine which waters a fish had been taken from by the flavor. The Eskimos (or Inuit) survived on a diet of raw fish, caribou, seal, and sometimes, when times were tough, on fricaseed sled dog. The word "eskimo" is a contemptuous Cree word meaning "eater of uncooked meat."

The world's greatest fish eaters are the people of Japan. They depend on sea food for a considerable part of their diet. American hot dogs are popular in Japanese cities, but inside the sausage skins the filling is tuna, not beef or pork. Fish restaurants and bars are much favored by city dwellers, and the Japanese pamper their palates with cool, bland sashimi (sliced raw fish) dipped in sauce. Tuna, albacore, and bass are most popular for this dish because of their mellow flavor and smooth texture.

Most westerners are surprised to find they like sashimi immediately. Once



the taste buds have been captured by sashimi's subtle flavor, this delicacy is claimed by many as their favorite Oriental dish.

Fugu is another great delicacy in Japan. This is a raw fish dish made with poisonous puffer fish. Some puffers develop a powerful nerve poison in parts of their bodies. The edible portions are skinned fillets, and they are sometimes mildly toxic. It is well to note that over 60 per cent of the victims affected by the puffers' tetradon poison die. It behooves one to be very cautious in determining whether the species at hand is edible. Specially trained cooks are able to prepare the puffer so that it is edible. Only government licensed restaurants are allowed to serve fugu; also, cooks in these restaurants must display their fugu cooking training certificates. Despite these precautions, there is an occasional fatality, and partaking of fugu is kind of like playing Russian roulette.

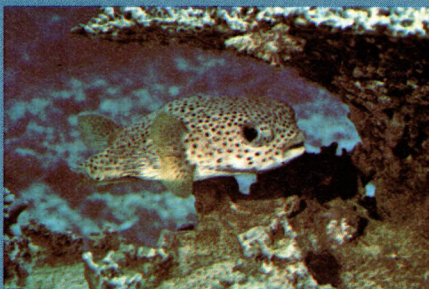
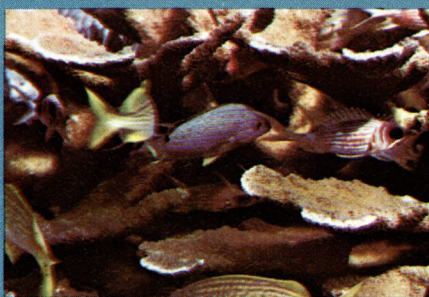
The procedure for preparing fugu is tedious and time consuming. The finished product is a beautiful arrangement of finger lickin' good fugu ready to eat. Naturally, it all results in very high prices for this fare. Fugu enthusiasts in Japan generally consume about three pounds of the meat at one sitting. The after effect, a slight tingling in the extremities, is quite noticeable and seems to be relished by fugu eaters; altogether it's a rather expensive method of acquiring a high!

All of the fish on the U.S. west coast are safe to eat excepting the puffer shark and the roe (eggs) of the cabezon. The puffer fish (blowfish) in Florida waters is an occasional problem. Large barracudas over 30 pounds, jacks, and groupers on the U.S. east coast can cause ciguatera poisoning if eaten. Not all large barracudas are carriers of the toxin that affects the nervous system. California barracudas are small and safe to eat. You should become well acquainted with fish species in your area if you intend to catch your own fish food.

The Center for Disease Control in Atlanta warns that eating some raw fresh marine fish should be recognized as a potential health hazard. There is a parasite found in some herring and other fish that can infect man when the fish is eaten raw. Infection may be prevented by freezing or thorough cooking. Freezing the fish at 14°F (-20°C) or lower for 24 hours should disinfect it. Normal refrigerator freezer temperatures are around 10°F while regular home freezers are 0°F. After 24 hours of freezing, fish may be thawed and safely used in raw fish dishes.

## HUNTING FISH

Hunting fish underwater is different from hunting on land. It combines all of the thrills and excitement of exploring, swimming,



***During the fifth century B.C., Greek gourmets would pay huge sums for fresh fish; a small flask of fish could be traded for 100 sheep.***

diving, hunting, and fishing. Catching the fish you want requires patience, skill, and ability. Also, you have to be in the right place at the right time, and do the right thing with the right equipment.

One of the oldest methods of catching fish was with a spear, and this primitive method is popular with divers today. The speargun is an improvement on the hand spear, but even a speargun is inefficient compared to a rod and reel used by a skilled fisherman. The speargun is more accurate and has a greater range than a hand spear, but requires a lot of time to reload. The hand spear is simple and easy to use,



but don't count on spearing a fish more than three feet beyond the tip.

Hand spears are most effective on small fish at close range and when hunting bottom fish in holes and crevices. For spearing blue water fish up to 25 pounds use a long spear, seven to nine feet with a three-inch slip-tip. For fish from ten to 25 pounds, use a spear five to seven feet long with a slip-tip. A three-pronged "paralyzer" tip about twelve inches long can immobilize a 25 pounder and is easier to use than a slip-tip. For pan-size fish up to ten pounds, or fish in dirty water, rocks, or caves, use a short spear, four to five feet long with a regular three-prong spear head. When replacing the rubber sling, get surgical tubing that is two-fifths the length of the pole and of a diameter that tests your strength to stretch it three times its relaxed length.

Fish are hungry and wary, like birds. Food will bring them in and sudden movements will cause them to take flight. Most fish have fair eyesight, an extremely good sense of smell, and excellent hearing. They can detect low frequency vibrations by means of their lateral line, the stripe that runs down each side from the gill to the tail. The trick to successful stalking underwater is to move slowly and make no noise. Bubbles and regulator noises frighten some fish. You can usually tell when a fish is ready to swim away by watching the dorsal fins. The dorsal fins are normally folded down on the back of a relaxed fish. An alerted fish will raise the dorsal fins just before swimming away. Take your best shot when the dorsal fin starts up. When going over the top of rocks and around points, you may surprise a fish. Have your spear or gun in ready position, you'll only have a split second to get a fish for the barbeque. If an open water fish is curious, you may have one chance for a good shot. The fish will swim toward you to investigate and then turn; take your best shot at the turn, that's as close as you'll ever get.

## CLEANING FISH

A few simple precautions taken right after the fish is landed will insure its freshness and delicate flavor. The digestive process in fish continues after death and does damage to the quality of the flesh very quickly. If unchecked, this chemical reaction eventually leads to bloat and rupture of the stomach walls. Fish that are not cleaned until the end of the day cannot be called fresh fish. To determine if a fish is fresh, check for the following: eyes are bright and clear, gills are red and covered with mucus, gills have a fresh odor, skin mucus is clear, flesh is firm and does not retain finger impressions, vent is pink and protruding, and there is no "fishy" odor.

The first action to take as soon as possible after capturing your fish is to eviscerate it. Slit the stomach open from



anus to gills and remove the viscera (digestive organs). Leave the head on to help preserve the fish. It should be kept cool by putting it on ice or in a wet burlap bag to retard decomposition. Keep the bag wet and evaporation of the water will keep the fish cool. Cold running water will also keep fish cool. If you are aboard a dive boat, remove the entrails of your fish after the last diver is out of the water. Fish entrails can cloud the water and foul the bottom for other divers if discarded prior to the end of a dive.

In warm weather, you can get your fish home in good shape even if you don't have ice or running water by corning it. After cleaning and washing, rub the belly cavity with common table salt mixed with pepper in the ratio of one tablespoon of pepper to one cup of salt. Then rub the mixture on the skin side. Lay the fish in a container which can be covered with a wet burlap bag above the fish to allow for air circulation. The fish will keep for at least 48 hours. To prepare the fish for cooking, simply give it a thorough washing.

#### FILLETING FISH

To prepare a fish for raw fish dishes, it should be filleted to remove all bones. Filleting is the neatest and quickest method of preparing fish, and you need not eviscerate it first. To make filleting easier, use a good fillet knife. The blade should be thin, narrow, and razor sharp with length enough to span the width of the widest fish you intend to fillet. To maintain a sharp edge on your filleting knife, use a stone and a steel. The steel will provide a longer lasting edge.

To fillet:

1. Make a deep diagonal cut behind the gills. Cut at an



angle that will get as much meat off the top of the head as possible.

2. Turn the knife flat and slice along the backbone and over the ribs and tail. Leave the skin attached at the tail to help remove the skin in the next step. On a large fish, slice down the back from head to tail along the fins and spine while separating the meat from the bone.

3. To remove the skin, lay the fillet, skin side down. Start the cut at the tail between the skin and the meat. Work the knife along the skin while cutting the fillet away from the skin.
4. Remove the rib section if you left any of it on. Remove any other bones you may find. Now you have a real fillet.
5. Turn the fish over and repeat procedure on other side.
6. Wash fillets if necessary. Refrigerate or freeze until ready to use.

#### FISH RECIPES

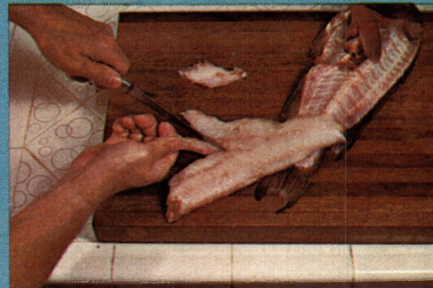
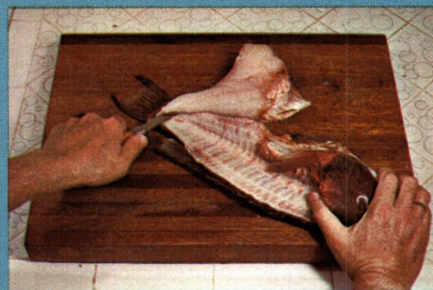
Most of us in the U.S. prefer our fish cooked, and if cooked properly, fresh fish can taste as good as lobster. Fish protein is best when cooked only slightly (till it flakes) to develop flavor and to preserve its naturally moist, tender quality. The Orientals and some Latin nationalities will tell you that the best way to cook fish is not to. Believe it or not, some raw fish dishes are so delicious that you can't stop eating with just one bite. Try the ceviche recipe and see.

#### CEVICHE

Someday, you may be stranded on a barren island and have to eat raw fish to survive. If you have never eaten raw fish, then the following recipe adapted from *The Edible Sea* will help you make the conversion a very pleasant experience.

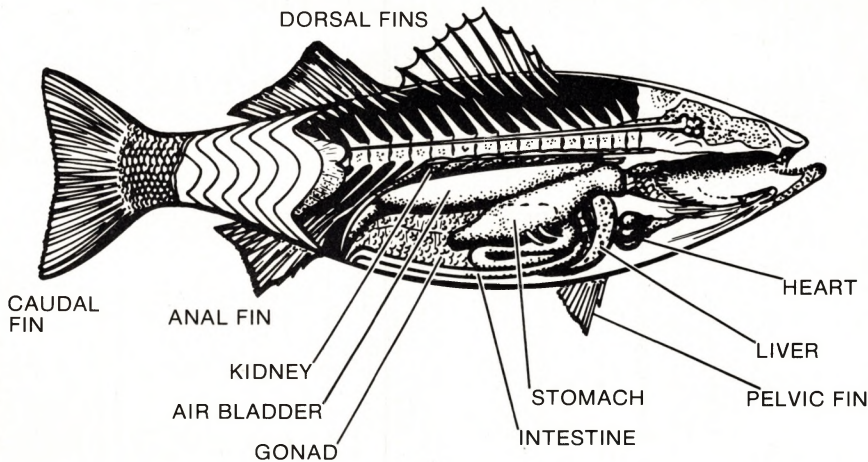
- 1 to 1½ cups diced fillets (white lean fish), about 1 lb.
- ¼ cup lemon or lime juice
- 1½ teaspoons salt
- 8 oz. can whole tomatoes, diced; or
- 1 cup very ripe
- 2 tablespoons minced onions or ½ cup chopped fresh onions

### *The Center for Disease Control in Atlanta warns that eating some fresh marine fish raw can be a potential health hazard.*

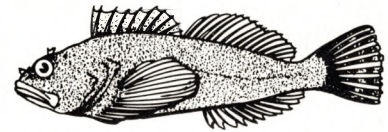




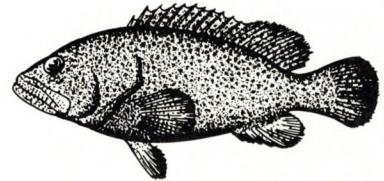
## ANATOMY



## CABEZON



## GROUPE



4 oz. can Ortega diced green chilis  
2 tablespoons wine vinegar  
 $\frac{1}{2}$  teaspoon oregano  
Mix first four ingredients and marinate for  $1\frac{1}{2}$  hours or more. Add remaining ingredients and mix well. Chill until ready to serve. Serves 10 to 20.

If you would like to have ceviche on a dive trip, prepare the sauce before you leave. Then, after you catch your fish, all you have to do is fillet and dice it and add it to the sauce.

### SASHIMI

This is a basic recipe for sashimi, and other combinations of seafood and vegetables may be added. The delicate color of tuna, the bright hue of salmon, and the pure white of a sea bass make a colorful arrangement.

#### Fillets:

1 lb. fish ( $\frac{1}{3}$  lb. each of three types)  
1 cup of shredded lettuce (or 3 whole lettuce leaves)  
soy sauce  
small dishes of grated daikon (Japanese radish), horseradish, ginger, or miso mixtures

With a very sharp knife, slice the fish across the grain. Cut into  $\frac{1}{8}$  to  $\frac{1}{4}$ -inch slices. Line a platter with shredded lettuce or lettuce leaves. Arrange the fish over the lettuce, overlapping the slices to create an attractive pattern. Keep each type of fish separate from the others. Each guest dips a slice of fish into one of the sauces when ready to eat.

### ARTHUR GODFREY'S FAVORITE

Arthur says, "The reason lots of folks are not turned on by fish is that they overcook it and it's not fresh in the first place!" To further quote Arthur, his exact instructions for his favorite fish recipe follows.

1. Catch your fish yourself so you know its fresh.
2. Fillet it.

3. Cut into bite size chunks and place with a square of **real** butter, pepper, and salt in a piece of aluminum foil.
4. Place the package on a grill over hot coals. When the foil gets too hot to touch, take it off the fire, it's done!

Parts of this article are excerpted from *The Edible Sea* by Paul and Mavis Hill, published by A. S. Barnes & Co., Inc. For comments to authors or autographed copies of book, contact Educational Services; P.O. Box 15145; Long Beach, CA 90815.

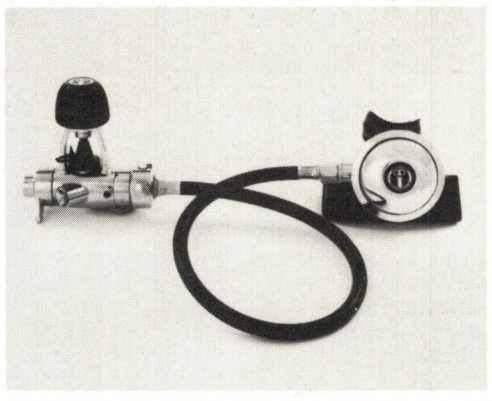


*Fish is one of the most healthful foods around, but caution should be exercised when selecting food from the sea. The roe of the cabezon is toxic, an large groupers can cause ciguatera poisoning. Some research being done now suggests that parrot fish absorb poisons from other species in their food chain which renders them unfit for consumption.*





Retaining its forged yoke and body construction, the Calypso J features a new internal design with better flow capability and reduced breathing effort. From U.S. Divers, 3323 W. Warner Ave., Santa Ana, CA 92702.



## New for '78

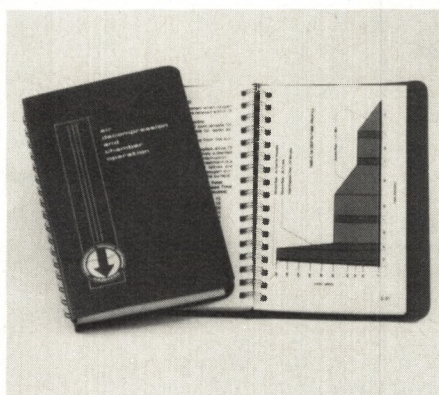
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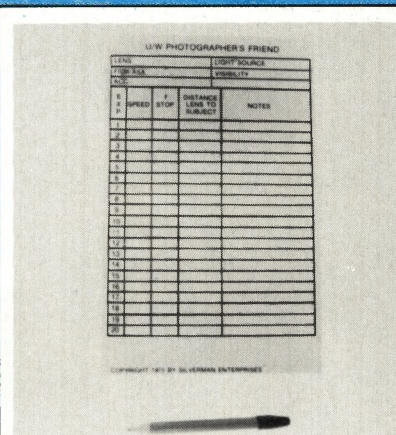
**WHOSE IS WHOSE?** Now you can permanently identify your equipment easily and attractively with PENNFORM'S new identification letters and numbers. Simply peel off the back and press into place. PENNFORM'S one inch high bold numbers and letters can be applied to any hard, smooth surface such as tanks, spear guns, light housings, slates, camera housings, cases and more. Complete alphabet and numbers to choose from in either black or white. Look for our display at your favorite dive shop. Pennform Plastic Products, Inc., 365 Mulberry, Wyandotte, MI 48192.



Protect your valuable instruments against bumps, scuffs and scratches with PENNFORM'S new individual console and regulator bags. Available in five colors: Black, Blue, Red, Yellow, and Sierra Tan (leather look). Console bags available in three corresponding sizes. Oil and mildew resistant. Pennform Plastic Products, Inc., 365 Mulberry, Wyandotte, MI 48192.



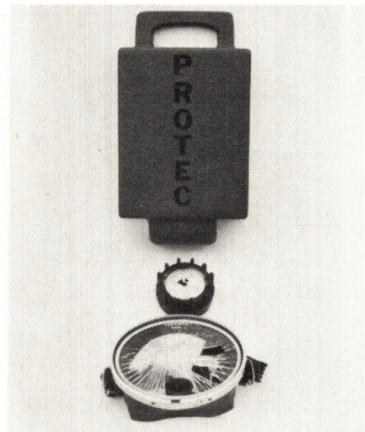
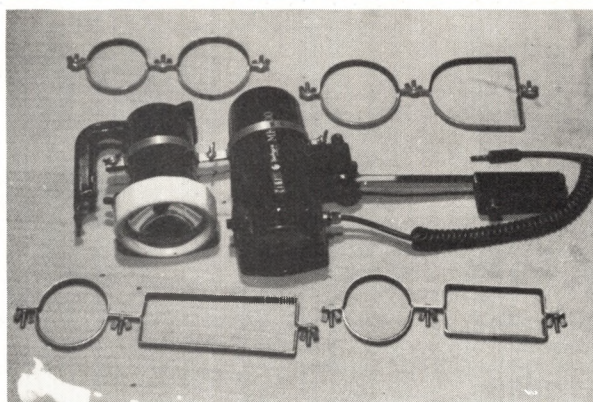
Compact and immersible, this pocket reference provides a convenient guide to decompression procedures and chamber operation. Comes with instructions, examples, and Navy dive tables. From U.S. Divers, 3323 West Warner Ave., Santa Ana, CA 92702.



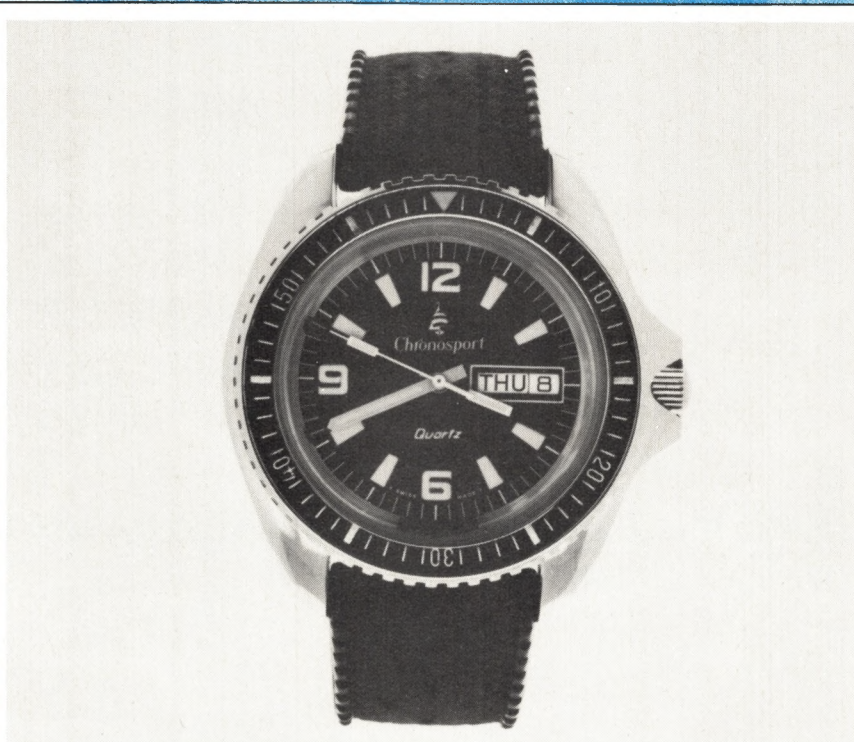
Now there's a simple way to record your exposure information underwater. The Underwater Photographer's Friend has a place for frame numbers, f/stop, shutter speed, subject and flash-subject distance. There's a place to store the pencil, too. Silverman Enterprises, 3673 Bassett Ct., San Francisco, CA 94080.



NOT A JUGGLER? . . . You don't have to be, all you need is The Helping Hand. The Hand attaches a dive light to your strobe, freeing your hands while assuring proper lighting angles. Made of stainless steel lined with rubber. World Below, P.O. Box 20622, S.W. Station, St. Louis, MO.



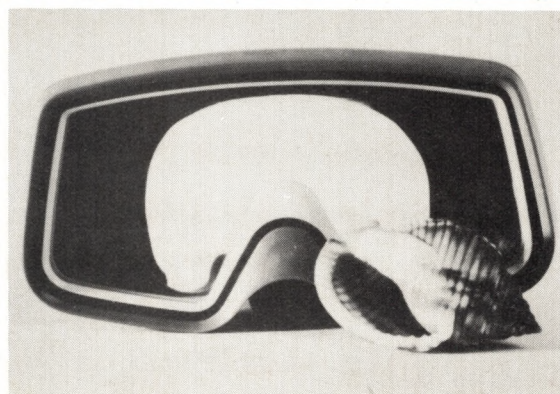
Where can you get a mask and a CPG for \$5.95? Nowhere, that's where. Protect those you already own with a Protec from Marind. Easily stored in the gear, it's constructed of high-impact plastic. Two year guarantee. Marind, Co., P.O. Box 1402, Manhattan Beach, CA 90226.



WIE VIEL UHR IST ES? Now matter how you say it, you'll always know what time it is with this Sea Quartz 30 from Chronosport. Quartz movement guaranteed accurate to within one minute per year. Stainless steel case pressure tested to 1000 feet, screw-down crown with flush mounted mineral crystal set in one-way ratchet bezel. Quick-change day date feature too. Chronosport, Inc., 119 Rowayton Ave, Rowayton, CT 06853.



BEATS WITCH DOCTORS . . . . . Dacor's new line of medical aids is designed to do just that. Six new products: three are formulas for sea stings; the others are a nasal spray, an ear solution, and a special cream to prevent severe sunburns. From Dacor, 161 Northfield Rd., Northfield, IL 60093.

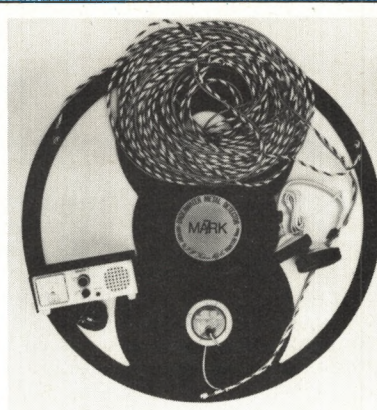


The new Concha mask from U.S. Nemrod boasts easy equalization and a double seal. Made of black all-gum rubber with tempered lens. U.S. Nemrod, 2315 Whitney Ave., Hamden, CT 06518.





New from U.S. Nemrod, the Tossa dive mask is made of black all-gum rubber and features a small internal chamber to reduce over-pressurization at depth. At dive stores in May. U.S. Nemrod, 2315 Whitney Ave., Hamden, CT 06518.



Discover a pot of gold! The new Mark 7 metal detector from J. W. Fishers is designed to be towed by a boat and works equally well in salt or fresh water. Detects all metals, ferrous or non-ferrous, maximum sensitivity eight and one half feet. Two year guarantee. J. W. Fishers Co., Anthony St., Taunton, MA.

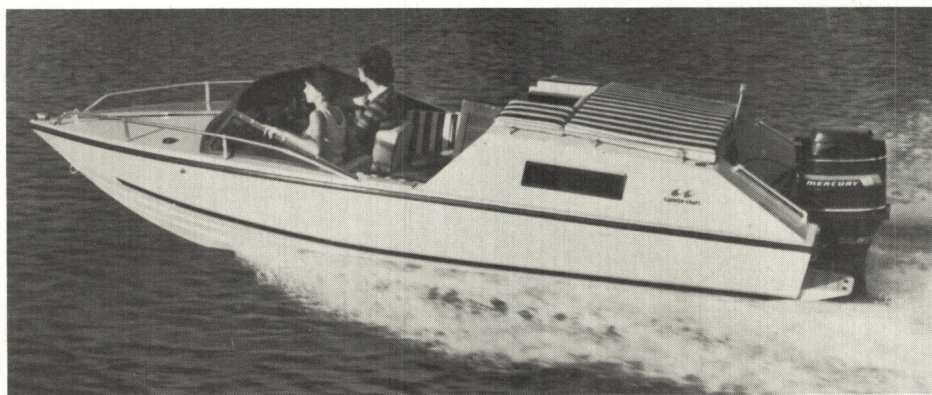


A revolutionary device for communicating underwater, the Sea Voice, has been introduced by Sea Sonics, Inc. The Sea Voice uses a specially designed rubber bladder to transmit sound energy from the voice into the water. There are no wires or batteries and the listener needs no special gear. From Sea Sonics, Inc., P.O. Box 94458, Schaumburg, IL 60195.



Scubapro introduces its new wetsuit, the Scubaproflex. It offers greater body heat retention, more flexibility and wearer comfort. The Scubaproflex is individually styled for men and women and is available in either 3/16" or 1/4" thickness. Wide range of sizes. Scubapro, 3105 E. Harcourt, Compton, CA.

This 19 foot runabout from Camper-Craft, the Model 19, sleeps four. Features a novel aft-cabin design which allows enough room for a galley, sink, head and shower. Camper-Craft Boats, c/o 7600 S.W. 57th Ave., Miami, FL.

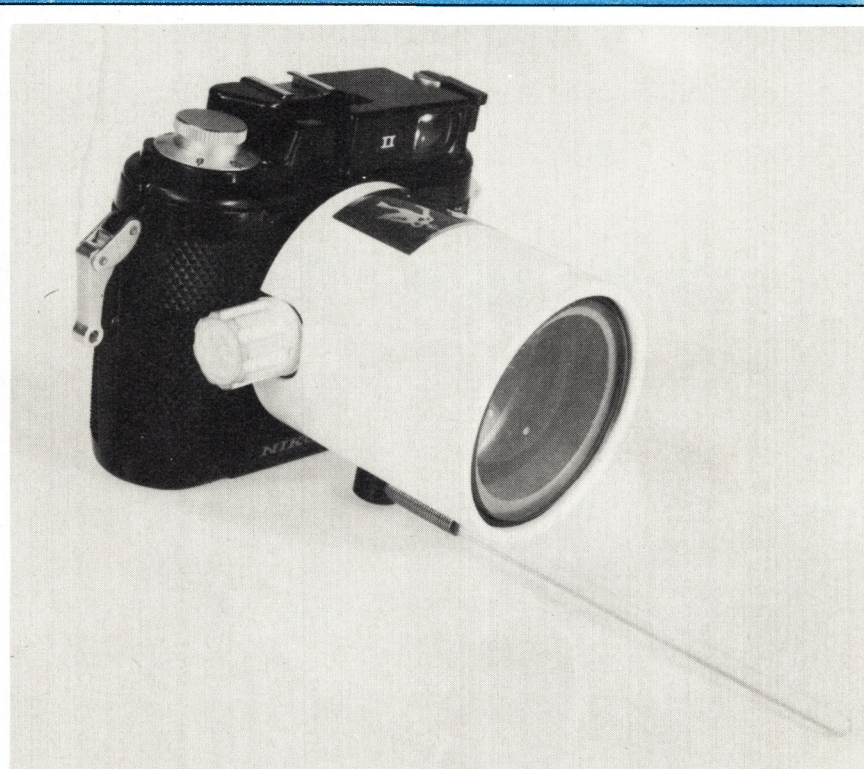




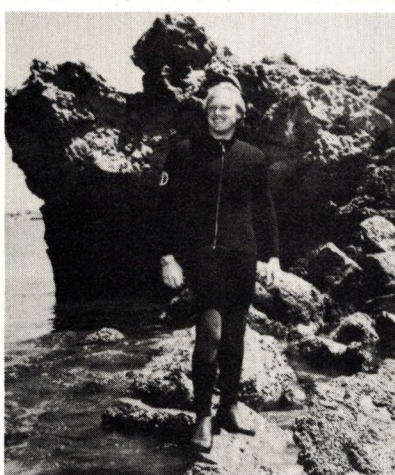
Big brother of the 22-2, Aquasport's new CCP (Center Console Professional) is designed for deep water. With a deep vee hull, the CCP has an extra large fuel tank, allowing an extended cruising range. The console is extra large to take sophisticated electronic navigational equipment and has lockable storage. Aquasport, 7925 W. 2nd Ct., Hialeah, FL.



**ALSO MAKES A FINE KAZOO ....**  
This snorkel has a flexible tube which allows it to bend while passing through kelp and brush. From U.S. Divers, 3323 W. Warner Ave., Santa CA.



Get the fine detail and color quality of a close up without tubes with a slip on I-2 close-up adaptor for Nikonos cameras from Sea Research and Development. This adapter features not only a spring-mounted distance probe, but color-saturating, sharp-focusing achromat lenses as well. Easily removed underwater, it allows instant use of lens for normal angle shots. Safety line provision. Sea Research and Development, P.O. Box 589, Bartow, FL 33830.



A quarter-inch thick, the new Taskmaster II wetsuit from U.S. Divers comes sewn inside and out. All edges are surged and it comes with spine, knee, and elbow pads standard. From U.S. Divers, 3323 W. Warner Ave., Santa Ana, CA 92702



This capillary depth gauge from Dacor is designed as a backup for silicone oil-filled gauges. Same size as its companion compass and thermometer, it fits easily on most watch bands. Five and ten foot depth increments. Dacor, 161 Northfield Rd., Northfield, IL.





# Travel the Tropics with **SPORT DIVER**

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Fresh Creek, Andros, Bahamas. Photo by Richard H. Stewart.





# SOUTH CAROLINA'S ARTIFICIAL REEFS

Story and Photography by  
Mike and Ann Adair

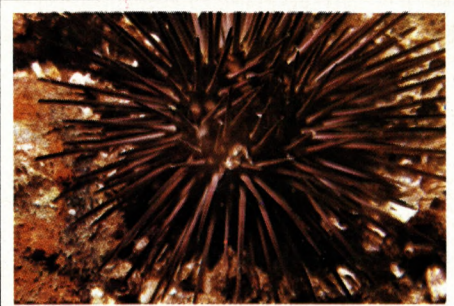


*Artificial reefs made of scrapped ships and baled tires in the coastal waters of South Carolina provide fish-filled oases for surface fishermen. Originally created to attract game fishermen to the state, the reefs proved an unexpected boon to coastal dive stores and charter boat operators, as divers from all over the east coast have discovered the large fish and usually good visibility.*

The sometimes murky surface water off the South Carolina coast obscures much of what lies below. Although not immediately apparent, a wealth of good reef diving is available not far from shore. The ocean bottom off South Carolina slopes gently towards the edge of the Continental Shelf, mile after mile of fine white sand with few marine inhabitants. In the middle of this underwater desert the South Carolina Marine Resources Commission has created nine man-made oases; nine artificial reefs, in a chain, stretching from Little River down to Hilton Head. The reefs vary from 3 to 13 miles offshore and are under 40 to 75 feet of water. The one-quarter to one-half mile square areas are well marked, both on the coastal charts and by buoys, and are within easy reach for a day-long excursion.

Construction of the chain began in 1967 with the hope of creating artificial fish habitats that would attract surface fishermen to the state. The first reef, Kiawah, was built using 75 auto bodies, 12 tons of concrete culvert, four pontoons, two mine sweepers, five ship hulls, and 47,000 baled tires. The car bodies were found to be hard to clean before placement, and they decomposed quickly in the salt water. The U.S. Navy provided the solution to this problem by donating scrapped ships, which, when sunk in the proper locations, proved ideal foundations for the reefs. The Commission then covered the ships with baled auto tires. Rubber deteriorates very slowly, is not toxic, and when piled in great heaps over the hulls, the tires provided the perfect haven for a number of smaller species. A pile of





tires on a reef site several years old may be covered over with growth and appear to be a natural formation. The derelict hulls are covered quickly also and the marine community shows its approval by taking up residence almost immediately.

A fair sampling of mid-Atlantic species inhabits the reefs. Spade fish are often seen near the surface, circling the buoy chain. Trigger fish, black fish, and sheepshead dominate the reef structures. Mackerel and bluefish often cruise among the tires, hunting some of the dozen or so smaller species that dart in and out of the stacks of tires. Divers have reported grouper in excess of 250 pounds on the Capers Reef, while surface fishermen brag about the size of the black sea bass, bluefish, spanish mackerel, porgy, grouper, and flounder they've caught over some of the reefs. The largest sea trout on record in South Carolina was caught off the Fripp Island Reef in 1971.

A group of unplanned artificial reefs also exists off the South Carolina coast in the guise of several excellent steel shipwrecks. The wrecks, the City of Richmond, the Georgetown, and the Hector are all in less than 50 feet of water, and with the exception of the Georgetown, are marked with buoys. These wrecks harbor the same variety of fish found on the reefs, and visibility is generally 12 to 20 feet, with occasional 150 foot visibility. Warm summer days offer the best chances for temperate conditions and good visibility.

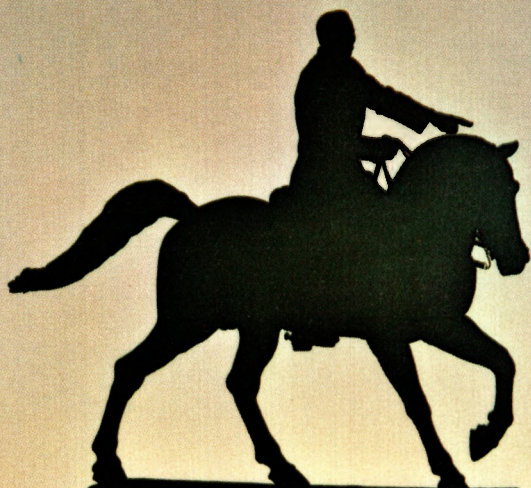
Although the reefs and wrecks are maintained primarily for surface fishermen, divers from all over the east coast are now benefiting, and coastal dive stores throughout South Carolina charter regular trips to these man-made underwater havens. More information on locating these sites and arranging for boat charters may be obtained by writing the local dive stores or the South Carolina Marine Resources Commission, Fort Johnson, Charleston, South Carolina 29407.



*An urchin (top) relays a spiny welcome to reef visitors. The wrecks and mounds of baled tires provide a day's worth of exploration for the inquisitive diver and a protected habitat for the smaller reef species.*







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# Treasure Hunt

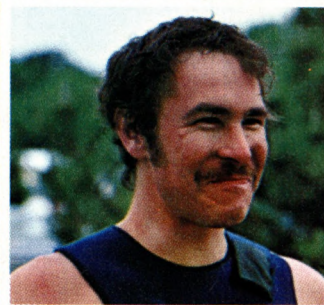
## 78

Remember Treasure Hunt '77? It was an occasion for wining and dining and diving for sunken treasure in Canada. So if you missed it, it's all going to happen again this June 10th and 11th.



Every year since 1971 Joe and Carol Caputo of Sub-Mariner's Diving Equipment in Toronto have organized a Treasure Hunt for scuba fans all across the globe.

"I can remember the first time we mentioned having this function in 1971," Joe says. "At that time it seemed nobody was really interested in what happened to the divers that were trained except a few small clubs who really were trying their best to keep them active. So with this in mind, A Treasure Hunt was born, to look after the novice diver as well as the ardent and more experienced."



Treasure Hunt is a weekend affair. It starts Friday night as scuba enthusiasts arrive, set up camp, drink O'Keefe beer, renew old acquaintances, and party on through the night.

Saturday night is more of the same with a big get-acquainted dinner and dance. After the dinner settles down a bit the bar swings into high gear, putting out as much of anything as anyone cares to put down.

Sunday is Dive Day. Heavy wet suits are a must as the water temperature hovers around the mid 40's. Everyone suits up and lines up in waist deep water awaiting the start signal, which is a display of fireworks and then they're off!

What the treasure hunters look for are small weighted markers with numbers on them, these numbers determine what their prizes will be.

The weekend is, all in all, a good time and a partying experience. If you'd like to attend Treasure Hunt '78 contact Joe and Carol Caputo, Sub-Mariner's Diving Equipment LTD., 928 Wilson Ave., Downsview, Ontario, Canada.



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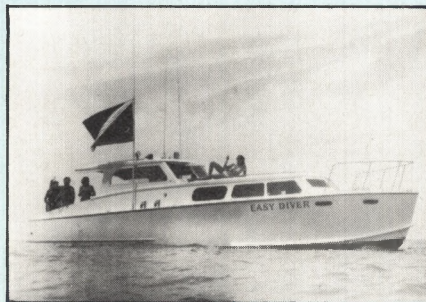
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*Jan Steffen*

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## BENEATH THE SEA

continued from page 30

concealed under coral or between rocks and rubble, and can sometimes be found fossicking around the reef searching for prey. If disturbed by a diver, they will unhurriedly move away from this annoying disturbance. When handled by a diver the shrimp reacts first with lightening fast strikes of its razor sharp claws, which can easily wound a finger, so care and heavy gloves should be used when examining this crustacean.

This animal has a tail armed with spines on the telson which it uses to block the entrances of its burrow when threatened by predators. The mantis shrimp can place its body safely in the burrow with only the tail exposed but well protected by the spines.

The reef species is graced with an aesthetic display of colors and patterns which stand out boldly against its surroundings. The body is in tones of olive green, with antenna, maxillipeds, chelipeds, walking legs, pleopods, uropod and telson laced with a vibrant red. Segments of the abdomen may be lined with red and the cephalothorax may have blotches of black in symmetrical patterns on each side. Claws are usually bright yellow and the uropod and telson (tail) have circles of vibrant blue painted on.

Mating is similar to other crustacea with the female carrying an egg mass which is either layed in a burrow or carried until hatched, depending on the species. When hatched, the larvae molt many times as they grow larger and some species reach lengths of 25 centimeters.

This unusual animal is not as common as some crustaceans, but with some patience and knowledge of their habits this curious organism can be found. They make excellent camera studies and interesting arthropods to observe, but watch those naked hands!

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### What Shell Is That?

Neville Coleman; Paul Hamlyn; 1975; Hardbound; \$12.95; 308 pages

As a photographic and descriptive index to the shells and mollusks of the Southern Pacific and Australia, *What Shell Is That?* contains over 750 species of shells. Each is portrayed in its various forms by a color photograph, is identified by its scientific and common names, and is described with notes on its range and habitat. The book is a culmination of Neville Coleman's years of marine research, during which he has travelled over 40,000 miles around the Australian coast collecting specimens and cataloging species. He has discovered many species new to science, two of which bear his name. He is very well known as an underwater naturalist in Australia and is a marine associate of the Australian Museum. The book reflects both his expertise as a naturalist and his skill as a photographer.

### Films and A-V

Some new films and audio visual presentations dealing with various aspects of diving are listed below:

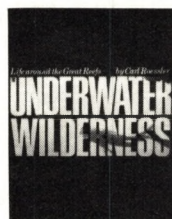
*La Mar*: Filmed by Ron Coley off Grand Canyon; *La Mar* has won a Silver Medal at the Virgin Island Film Festival and second place at the New York International Film Festival. Available in 16mm or Super 8 from Tom Hurst Associates, 7812 Longfield Drive, Ft. Worth, Texas 76108; (817) 322-1024.

*Wreck In The Graveyard Of The Atlantic*: Bill Lovin's "Wreck . . ." follows a group of five experienced divers as they explore a 500-foot World War II oil tanker sunk in 100 feet of water off North Carolina. The 19-minute color/sound, 16mm film is available for rental at \$30, or for sale at \$300. Contact Marine Grafics, Box 2242, Chapel Hill, North Carolina 27514.

*Shipwrecks of Isle Royale*: This A-V presentation explores some of the numerous shipwrecks that surround Isle Royale in Lake Superior. Presentation fee is \$15 from David Acton, 661 North Chubb Drive, Doylestown, Pennsylvania 18901.

# REVIEWS

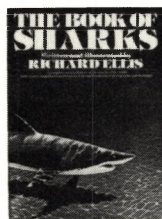
By Steve Blount



### The Underwater Wilderness

Carl Roessler; Chanticleer Press; 1977; Hardbound; \$35.00; 319 pages

As a photographic and scientific essay on the great reefs and their inhabitants, *The Underwater Wilderness* is superb. As an artistic photographic expression of Carl Roessler's life-long affair with the sea, it is supreme. The text outlines the formation and growth of the great coral reefs, and lists area by area the reef type and inhabitants of the major reef sites: Hawaii, the Galapagos, Baya California, the Caribbean, Cozumel, Yucatan, Roatan, Cartagena, Netherland Antilles, Caymans, the Bahamas, French Polynesia, Micronesia, Truk, Palau, New Caladonia, the New Hebrides, the Philippines, Australia, the Coral Sea, the Mediterranean and the Red Sea. The number of fish, coral and invertebrate species portrayed is staggering; 16 species of butterfly fish alone. The 306 color photographs are superbly printed on high quality stock, and they are, of course, each a priceless bit of the last wilderness left on earth; preserved by a contemporary master.



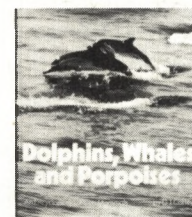
### The Book of Sharks

Richard Ellis; Grosset & Dunlap; 1976; Hardbound; \$25.00; 315 pages

This is a magnificent work on one of the least understood orders in the ocean. Richard Ellis is a noted natural history illustrator, and a self-confessed "sharkophile;" one of those people whose life has revolved around study of and respect for the many species of sharks. *The Book of Sharks* is a natural history of the various shark families, and contains 20

color plates of Ellis' best shark paintings, some of which have appeared in virtually every nature magazine in America. In addition there are many black and white illustrations, and a long text section dealing with the most famous "shark/people" such as Eugenie Clark, Peter Benchley, Perry Gilbert, Stewart Springer, Peter Gimbel, David Doubilet, Stan Waterman, Ron and Valerie Taylor, and the only three men known to have survived being bitten by a Great White: Rodney Fox, Brian Rodger and Henro Bource.

The illustrations of this 9½x12½ volume would by themselves make a complete and fascinating *Book of Sharks*, coupled with the detailed and knowledgeable text, they make a necessary addition to everyone's sea library.



### Dolphins, Whales and Porpoises

D. J. Coffey; Macmillan Publishing Co; 1977; Hardbound; \$17.95; 223 pages

The whole range of sea mammals is covered in this encyclopedia; the whales, the dolphins, the porpoises, sea otters, sea lions, seals, narwhals, walruses, dugongs, and manatees. There is an excellent section dealing with the evolution of sea mammals, from land creatures to marine dwellers and the adaptations the different species have made. For each of the three orders, cetacea (whales and dolphins), Pinnipedia (seals, sea lions and walruses), and Sirenia (dugongs and manatees), there is a dictionary of species detailing identifications and differences of each family and species of the order. There are many excellent photographs and drawings illustrating both the different species and their exploitation by man.

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## EDUCATIONAL & RESEARCH EXPEDITIONS ET CETERA

### Project Ocean Search

The non-profit Jean-Michel Cousteau Institute has announced its schedule of Project Ocean Search programs for 1978. The programs are designed to give the participants an understanding of man's relationship to the environment and inspire an increased appreciation of the necessity to protect and preserve it. Jean-Michel Cousteau personally leads each expedition, and there are opportunities to earn academic credit through the University of Southern California; also provision can be made for those who wish to conduct independent research. The expeditions for this are:

**Atlantic:** A ten day program conducted on an island off the coast of South Carolina in the heart of one of the most pristine salt marsh environments in America. Cost is approximately \$650 including all travel expenses from Savannah, Georgia.

**Caribbean:** A three week program during June/July conducted on the islands of Antigua and Barbuda in the Lesser Antilles, or islands in the Gulf of Honduras. The cost is approximately \$1800 including all travel from Miami International Airport, Miami, Florida.

**Pacific:** A ten day program in July on Santa Catalina Island off the coast of Southern California. Cost is approximately \$600 including all travel from San Pedro Harbor, California.

**South Pacific:** A one month program in August on the western islands of the Bismarck archipelago, Papua, New Guinea, just south of the equator in the Indo-Pacific region; or coral atolls of the South Pacific in Polynesia near Tahiti. Cost is approximately \$3400 including all travel expenses from Los Angeles or San Francisco Airports, California.

The program costs include all activities; room and board; materials and equipment except personal diving gear; and all fees and taxes. Write: The Jean-Michel Cousteau Institute, P.O. Drawer CC, Harbour Town, Hilton Head Island, South Carolina 29928.

### EARTHWATCH

The non-profit Earthwatch organization is offering a number of research-support programs for members of the general public this year. Earthwatch matches scientists who need help with people who can contribute their time, interest and financial support. The expeditions include Jamaica, Bonaire, North Carolina, the Galapagos and England. Write: Earthwatch, 10 Juniper Road, Belmont, Massachusetts 02178.

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## David Doubilet Holds Course At Aquaventure/Habitat

David Doubilet, noted freelance and contract photographer for *National Geographic Magazine*, recently conducted a highly successful Photo Workshop for advanced students at Aquaventure/Habitat under the auspices of its director, Cap'n Don Stewart.

Loaded down with amazing amounts of gear, Doubilet lead his class of photo-pros several times daily to shoot the unique fish and coral life around Bonaire. Evenings not scheduled with night dives were filled with classes, slide shows and the best diving movies from Cap'n Don's archives.

Critique classes were facilitated with the availability of the Habitat photo lab now directed by Bruce (Teacher) Bowker. Since both color and black and white can now be processed at Habitat, each student's work was developed overnight and then studied by the entire group.

Habitat Dive Master Ady also organized a "surprise first" at the Bonaire Cultural Center — a special Doubilet slide show free to anyone who wished to attend. Over 50 enthusiastic divers applauded Doubilet's talents and heard of his adventures as the underwater still photographer for "The Deep" with Jacqueline Bisset (a very competent diver and terrific, sweet, warm lady, David said). David Doubilet's closing line for the evening: "I wish sometimes I were a harmonica player so I wouldn't have to carry all that heavy equipment around."

Doubilet will hold another photo course at Aquaventure/Habitat next January. Details will be available shortly by writing Cap'n Don Stewart at Habitat, Bonaire, Netherlands, Antilles.

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## Nikonos III by Nikon







Richard Stewart



# Underwater Photography

by Richard H. Stewart

For either the basic or advanced underwater photographer the equipment needed for macro and close-up photography are exciting additions to a Nikonos or SLR camera system. For the beginner, macro photography can be an important step in the early stages of learning as, once exposures and distances are established, macro photography is almost fool-proof. Using the correct accessories with electronic flash, even the inexperienced can achieve a large percentage of successful photographs. First we'll examine the required accessories.

## TUBES

The most common method of adapting a Nikonos for macro work is the with extension tubes, also referred to as macro tubes. This is a set of metal tubes which are inserted between the lens and the camera body. By doing so, the lens is placed farther from the film plane, allowing you to focus on objects very close to the lens. The minimum focus for a 35mm lens without tubes is about 2½ feet. The length of the tube determines how close you can focus, and therefore the reproduction size of the subject. The reproduction ratio describes the size of the object on the film in relation to its actual real life size. For the Nikonos with a 35mm lens, there are three macro tubes, which give reproduction ratios of one to one (1:1), one to two (1:2), and one to three (1:3). The width of a 35mm film frame is one inch. Using the 1:1 tube, if an object is actually one half inch long, it will occupy one half inch on the film frame. If the object of one inch long, it will occupy the full one inch width of the film frame. Using a 1:2 tube, the image on the film will be one half the actual size of the object. A one inch object would occupy only one half inch on the film frame. Using a 1:3 tube, the image on the film would be one third the actual size of the object.



## Macro and Close-Up



## FRAMING

Each macro tube comes with a wire framer. Without this framer, composition is very difficult. Once an extension tube has been inserted between lens and camera, the viewfinder of the Nikonos is rendered useless as its field of view no longer corresponds to that of the lens, due to uncorrected parallax. Also, due to the shallow depth of field, (depth of focus) when using the tubes, the framing device aids in placing the subject within the area of sharpest focus. Keep in mind that the depth of field is not broken equally between the front and rear of the framer; one third of the field of focus will be in front of the frame, two thirds will fall behind it.

## LIGHTING

The restricted depth of field dictates that you use the smallest possible f/stop, so an electronic flash is a must. Your exposure while using the tubes will be consistent once the proper guide is established. The correct exposure will depend on the intensity of your light source, film speed (ASA), tube in use, and distance from strobe to subject. For example, with a 1:2 tube using a high power strobe such as the Oceanic 2003 or the Subsea 225 at full power, with Kodachrome 25 (ASA 25, an excellent film for achieving sharp photos) you can generally count on a consistent strobe to subject distance of four to six inches at f/22, depending on the color of the subject. Use the shorter distance for very dark subjects, the longer distance for light ones.

As you move the lens farther from the film plane using the 1:1 tube, the light has to travel farther to reach the film, and so will "fall off", or lose intensity, causing underexposure. To compensate, move your light source closer to the subject or open your aperture one additional stop to f/16. Keep in mind that the wider your aperture (or the smaller the f/stop number), the shallower the depth of field will be. If your strobe is less powerful than the Oceanic 2003 (Guide Number 00 with ASA 25), move to a higher speed film such as ASA 64 or 200. It is normally better to substitute a more sensitive film than to sacrifice critical depth of field by using a wider aperture.

For best results using whatever system you have, jump into a pool with your tubes and a slate. Begin by photographing a small object using f/22. Place your strobe one inch from the object, shoot, and record that distance and frame number on your slate. Repeat this same step increasing the strobe to subject distance one inch each time, and recording the distance and frame number on the slate. If you're using a high power

*Utilizing the Nikonos macro system accessories adds little bulk to the photographer's equipment yet yields exciting new picture possibilities such as this photograph of the banded shrimp (below left) taken with a 1:3 extension tube, or these bright yellow anemones taken with a 1:1 tube. At right, the yellow crinoids were photographed with the Nikonos close-up lens, while the butterfly fish was captured with a 55mm Micro-Nikkor macro lens on a housed SLR.*



Richard H. Stewart





*Nikonos close-up  
lens system*



*Nikonos macro  
system*



*Set of Nikonos  
macro tubes*



strobe, begin with ASA 25 film, if you have a low power strobe try ASA 64 or ASA 200. Process the film (use Kodak processing or the frames may not be numbered) then compare your slate notes with the best exposures to determine your exposure guide.

#### CLOSE-UP LENSES

At present there are several companies producing quality close-up lenses that attach to the front of the Nikonos primary lens. Referred to as supplemental lenses, they are made of precision-ground optical plastic, and can be changed underwater to compensate for a closer than normal camera-subject distance. Each lens will cover a certain area, focus at a certain distance, and yield a specific depth of field. There are no adjustments available to alter the area, depth of field or focus other than changing the supplemental lens. Their focus distance varies from 6 to 20 inches, and they come supplied with a plastic rod attached to aid you in placing the camera at the right distance.

Another alternative for close-up photography is the Nikonos close-up system. Composed of a two-element, twogroup precision-ground glass lens, the Nikonos auxiliary system can be used with Nikonos 28mm, 35mm, or 80mm lenses, and produces clean, sharp images. Depth of field ranges from three inches with the 28mm lens to as little as 3/10 of an inch when using the 80mm lens at f/5.6. The Nikonos close-up system is very good for the those subjects larger than three inches (maximum size for use with macro tubes) up to approximately 6½ x 8½ inches.

#### SLR CLOSE-UPS

Top side close-up tubes used with a single lens reflex camera contained in a housing have certain advantages not obtainable with the viewfinder-type Nikonos system. The photographer can see and focus through the camera lens and thus sees in his viewfinder exactly what will appear on the developed film. Using the Nikon 55mm micro or 105 micro, or the Canon 50mm macro lenses will provide the magnification needed to shoot full frame fish pictures, yet allow you to stay back a certain distance from skittish subjects.

As with all photography, success is the result of a balance of efforts. Of course you must have a camera system that will perform to whatever degree of quality you choose, but most of all you need the determination to make your worst shots become your best; a goal that can be attained only through practice.



# PHILIPPINES

## ADVENTURE CRUISES

Dive the Philippines 7,000 islands from the incredible 102 foot *Seaquest* cruise boat. Good food, comfortable accommodations, freshwater showers

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**SEAQUEST**

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## Don't Let The Next One Get Away!

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This new power pole spear from Sport Diver's manufacturing puts an end to botched shots. Made of a special heavy-duty, non-corrosive aluminum alloy, it has a positive lock/quick release trigger built into the molded urethane grip. Disassembles in seconds to fit easily in gear bag and features stainless steel studs, will accept all standard 6mm tips, including our paralyzer tip. 3 foot spear \$24.95; 4 foot spear \$26.95; 5 foot spear \$29.95. Available at your Pro Dive Store or write:

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(305) 947-5692**

Sport Diver

### Degree In Nautical Archaeology

Underwater exploration and recovery of ancient wrecks and artifacts on a scientific basis began as a new branch of archaeology only fifteen years ago. Prior to that time most of the Greek bronze statues now in museums had come to us from the sea from chance dives of sponge divers or fishermen.

The decade of the 1960's was devoted to the development of techniques for studying sunken remains, and the University of Pennsylvania became the world leader in this field under the direction of Dr. George Bass, Professor of Pre-Classical Archaeology. To date, Dr. Bass and his colleagues have completed over 10,000 decompression dives between 100 and 150 feet. Priceless historical data and objects of art have been obtained from ancient ships dating back to the Bronze Age.

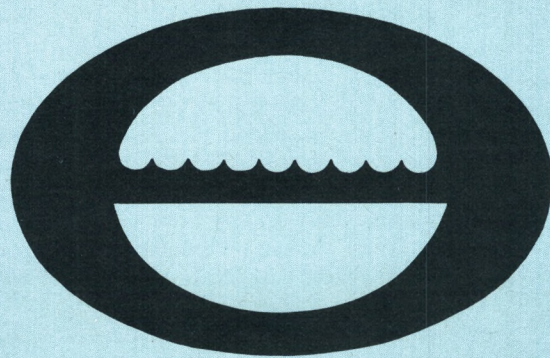
Now you too can be a part of this underwater exploration program and earn a Masters degree in the process. Texas A & M University, through its Geography Department is offering the degree of Master of Science with a specialization in nautical archaeology. Dr. George F. Bass and Dr. Frederick H. van Doorninck, Jr., in alternate years, are offering a seminar on the history of ancient seafaring; Mr. J. Richard Steffy will be teaching a course on the theory and history of wooden hull construction, and a laboratory course in which students can receive practical experience in lofting, building and testing models and participating in the full-scale reconstruction of parts of ancient vessels excavated by the staff; and Dr. Edwin Doran will be offering a course on the culture history of water craft, covering both Western and Far Eastern traditions.

These courses will be tailored to suit the specialized aims of each student. Knowledge of one modern language is required for the degree, and Spanish, German, French and other languages may be studied in the Department of Modern Languages.

Application forms for admission to the Graduate College and forms for applying for Teaching Assistantships can be obtained from Dr. George F. Bass, Anthropological Research Laboratories, College of Liberal Arts, Texas A & M University, College Station, Texas 77843.

**Instructor/Divemaster Wanted**  
Send resume to:  
Taino Beach Hotel Resort  
P.O. Box 1253  
Port-Au-Prince, Haiti





Story and photographs by Richard H. Stewart

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(213) 433-7485

### Vision 360

Vision 360 will be the first of an annual underwater symposium to be held in Buffalo, New York on September 9, 1978. The program will consist of in-depth presentations on selected topics in the fields of sport and commercial diving, mini-seminars and workshops, as well as debates on some of the hottest issues in diving today. The evening will be a time to sit back, relax and enjoy an underwater film showing of the finest material available. This day-long program has something to offer every class of diver around the water and away from it. For information and tickets contact:

Dallas Edmiston  
185 Forest Hill Drive  
Williamsville, New York 14221

### Underwater Photography Show and Contest

The Loft Art Gallery and Princeton Aqua Sports will be co-sponsoring an underwater photography show and contest in June in Princeton, New Jersey. Entries must be suitable for hanging (frames or brackets). Slides will not be admitted. Entries will be accepted between May 30 and June 1. The date of judging will be announced.

Entries must have been taken underwater by the entering contestant. Professional photographers may not enter. The awards will be gift certificates for purchases at Princeton Aqua Sports. The panel of judges will be well known photographers to be announced later, and their decision will be final. Call Princeton Aqua Sports for entry forms:

609-924-4240

### Underwater Symposium Florida Institute of Technology

Whales, sharks and tropical reefs are part of the program at Florida Institute of Technology's second annual Underwater Symposium. This year the event will be preceded by an underwater film festival with competition to be held Friday evening, April 14 from 7:30pm until.

Jean Michel Cousteau will be the featured guest speaker for the program to be held on Saturday, April 15. Cousteau, who has spent a great deal of time working with his father Jacques, planned, directed and organized the logistics for the production cruises during the filming of "The Undersea World of Jacques Cousteau." Others on the program include Bob Fronk, southeast branch manager for NAUI; John Larsen, underwater photographer and explorer; and John Zumrick of the Naval

Experimental Diving Unit in Panama City, an expert in diving physiology.

The film festival will feature the work of Al Giddings, Stan Waterman, Jim Dutcher, John Stoneman, Jack McKenney and Robin Lehman.

The symposium will also feature equipment and technical demonstrations by the staff of the Harbor Branch Foundation and the F.I.T. Underwater Technology staff.

### Film Festival With A Message

Five hundred divers got together in December in San Marcos, Texas for an evening of films, slides and entertainment. The down-home casual affair was hosted by award winning film maker Ron Coley and manufacturer's rep Tom Hurst.

Sponsored by the San Marcos Dive Clube, the main thrust of the evenings program was to make the diving community aware of the tragic death of some 200,000 dolphins every year as a result of present day tuna fishing practices. Eric Peterson, dive club president explained "It's up to the people who love the sea to protect it, so what better group is there to take this cause than divers?"

For more information on what you can do to help write:

National Campaign to Save the Dolphins  
1765 P Street N.W.  
Washington, D.C. 20036

### Second Annual SPDM/UIPA Photo Competition Underway

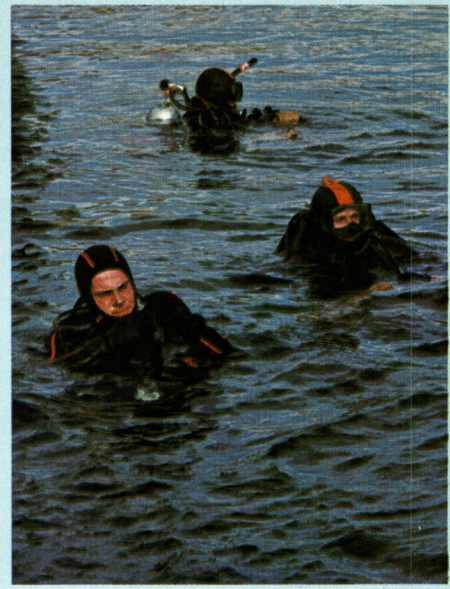
The second annual Sport Diver Magazine/Undersea Photographic Instructors Association photo competition is now underway. Judging for the first annual contest has been delayed due to the huge volume of entries, and the winners will be announced in SPDM's Third Quarter '78 issue to be released in July. The contest is open to all amateur photographers who may enter in the categories: Saltwater color; saltwater black & white; freshwater color; freshwater black & white; fixed focus color; fixed focus black & white; creative-special processing; and films. See entry form on page 99, or write:

Sport Diver Magazine  
103 Century 21 Drive, Suite 120  
Jacksonville, Florida 32216

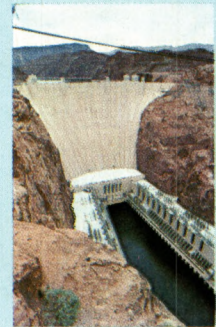
### Next Issue

Explore the almost intact remains of a German sub, the U-352, off the N. Carolina coast.





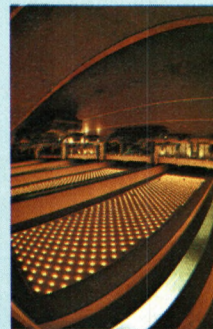
*In the flashy, gaming atmosphere of Las Vegas, it seemed natural to make the Lake Mead clean-up project a game with the inevitable "pay-offs". Garbage brought up by the divers ranged from boat ladders to duck eggs. The big winners were both the area residents, who received a clean lake, and the divers, who had a good time.*



Las Vegas has been known to really clean up in a night but Ken and Jim Heptner have a different way of doing it. For the second consecutive year Ken and Jim have organized and sponsored one of the most beneficial diving events; the ecology dive. And leave it to some Las Vegas residents to find a way to make a game out of doing it.

Every year the Las Vegas Scuba Center and the Las Vegas Dive Club, the Silver Flippers, gather some several hundred divers and spectators to the western water playground known as Lake Mead. The object of the game? To clean up every bit of trash around and under the docks of the Lake Mead Marina.

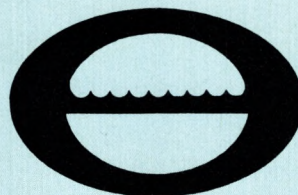
Registered divers were issued a number and then lined the walkway of the marina prepared to take the plunge. As each diver hit the water and began collecting trash, he would bring it to the surface and hand it to the



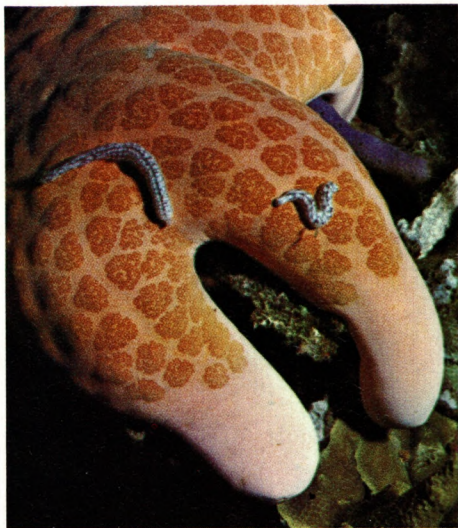
official trash receivers who would then attach a tag to it with the diver's number on it. In less than two hours after the starting signal, this relay race had blanketed the beach with various bits of trash. There was so much garbage that a dump truck was called to haul it away.

To determine the winning divers, judges recorded the volume of trash each diver brought up, and from these results they distributed the trophies. The largest trophy was awarded to the Silver Flipper Club by Lt. Governor Bob Rose for the most support from attending clubs. Another trophy was awarded to the club who traveled the most miles to attend the event, and six trophies were awarded for the largest volume of trash gathered.

The rewards of the day's diving surely aren't gold doubloons, but the results are well worth their weight in gold.







**L**ooking down from the 9600 foot summit of Apo Mount across several dozen of the 7,000 islands that are the Philippines, my eyes were drawn across miles of glasslike emerald green waters, shimmering opalescent under a tropic sun. Within them lay the promise of lush coral gardens and bottomless drop-offs, a paradise of colorful marine life.

The islands are the tops of a vast mountain range, which during drier periods in the Earth's history, were part of the Asian mainland. During the last ice age, about 10,000 years ago, the sea level was low enough that a band of migrating people called Aetas was able to take up residence in the Philippine range. Later, as the

glaciers melted and the sea level rose, the mountains were separated from Asia and became islands.

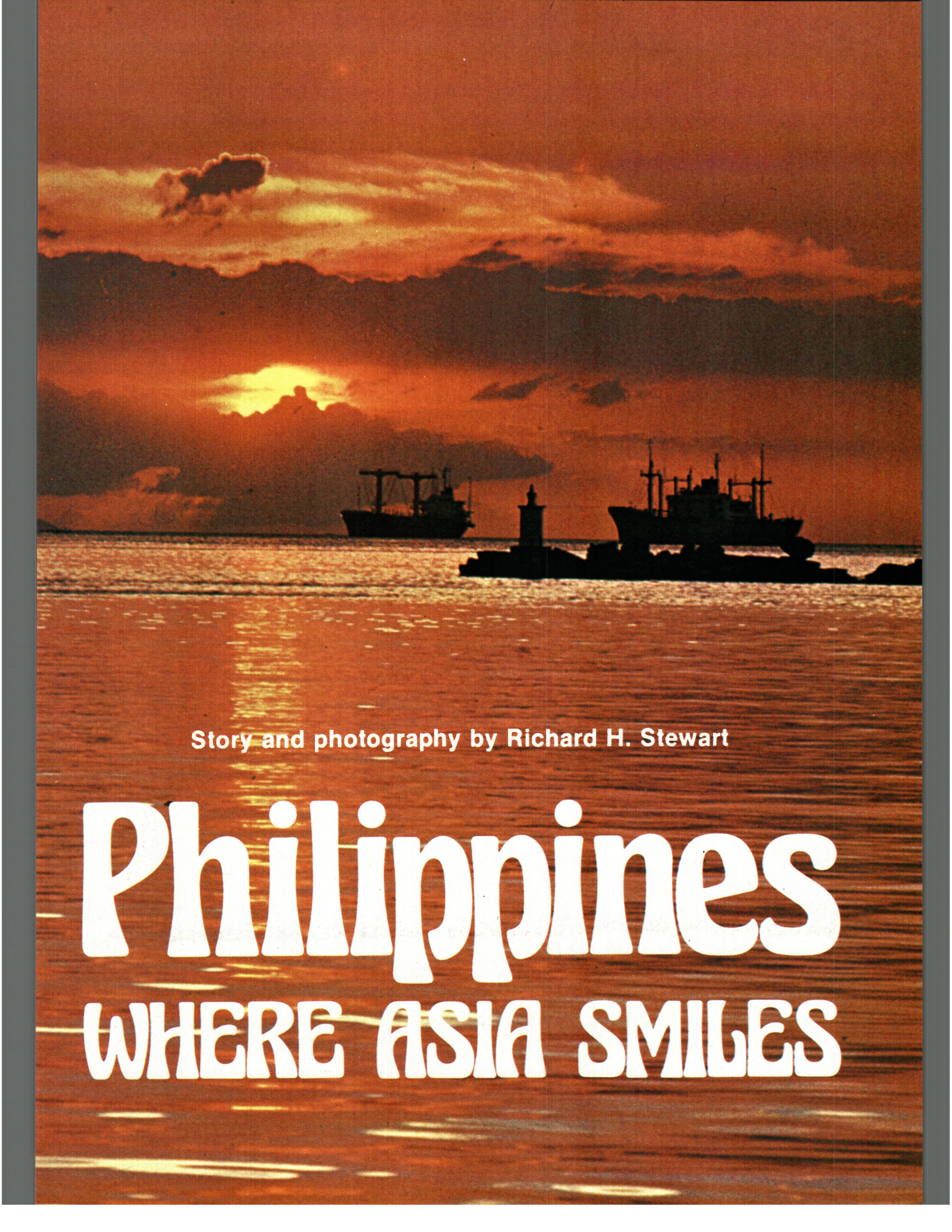


CARL ROESSLER

This migration of Aetas was the last to come overland, but only the first of many cultural infusions. Around 200 B.C. groups of Malays began arriving in boats made from large tree trunks. The Malays were taller and more advanced than the Aetas, and quickly dominated the islands, yet over the next 17 centuries, their influence was greatly diluted by the arrival of Arab, Chinese, and Indian traders. By 1521 the





A full-page photograph of a sunset over the ocean. The sky is a deep orange and red, with a bright sun partially obscured by clouds. The water reflects the warm colors of the sky. In the distance, the silhouettes of two large ships and a small lighthouse are visible on the horizon.

Story and photography by Richard H. Stewart

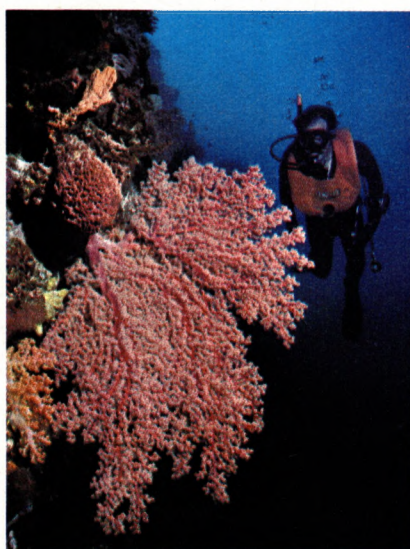
# Philippines

## WHERE ASIA SMILES





*From the mountainous island interior, the land slopes gently, fanning out across verdant rice paddies joining palm-lined white sand beaches that border the sea. The 102-foot Seaquest moves its base of operations several times each year to take advantage of the tremendous variety of sites in and around the ocean.*



Philippines were inhabited by a diverse but radically and culturally distinct people. In that year Ferdinand Magellan, a Portuguese explorer sailing under the Spanish flag, landed in the islands and was killed in a skirmish with native warriors. His men completed the voyage Magellan had envisioned, circumnavigating the world and reporting their discoveries to the Spanish crown. This led to establishment of a permanent Spanish colony in 1565 and over 300 years of Spanish rule. Named for King Philip II, the Philippines struggled under the imperial mantle until 1898 when they were ceded to the United States after the Span-

ish-American War.

**T**he Filipinos began taking more responsibility in their own government, and complete sovereignty was on the horizon, but independence was once again postponed by the three-year Japanese occupation during World War II. At war's end, the Philippines were given what they had lacked for almost four centuries with the creation of the Philippine Republic.

The centuries of racial mixing have left today's Filipino with the most pleasing physical features of the Orient. The physical features of the land are just as pleasing; some 50 volcanoes dot the





CARL ROESSLER





Sport Diver



islands, and clear mountain streams wind around their flanks, heading for the seemingly endless white sand beaches before plunging into the "Philippine Deep". This trench is the second deepest in the world, a 35,000 foot vertical drop-off, and through it move incredibly fertile waters, teeming with countless marine species. This abundance is very noticeable around the island of Cebu. While Cebu boasts the Philippines' oldest city and Fort Magellan, part of the country's Spanish legacy, its sister island, Bohol, is almost devoid of modern development. It is from here that the long-range dive boat *Sequest* operates its adventure cruises during the dry season, October to May.

**S***eaquest's* cruises are truly an adventure, a plunge into some of the least modernized areas of this fascinating country. The ship sails south along the Bohol coast as far as the tiny island of Bali-casag. Here the first drop in the water reveals on one side sheer wall diving starting at 5 to 10



Photo by CARL ROESSLER



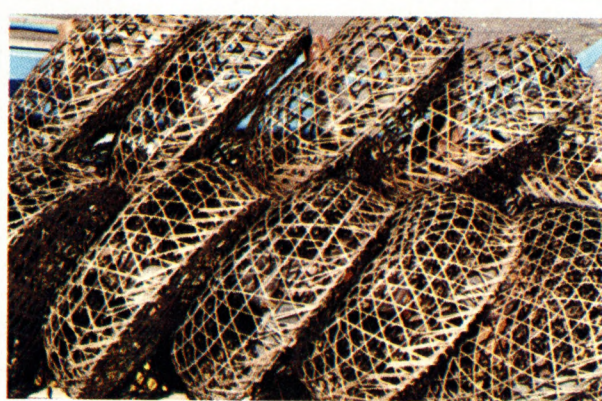
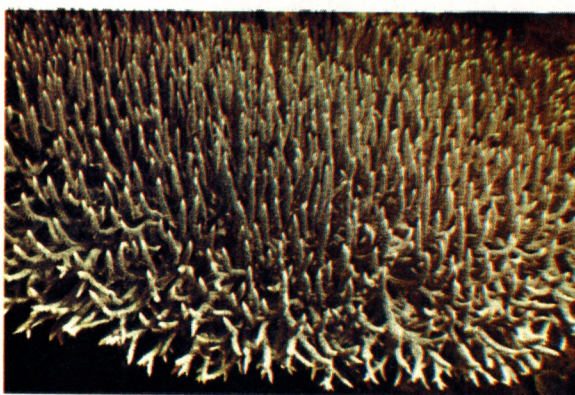
*The rich Pacific marine life ranges from colorful invertebrates to resplendent lionfish and the common clownfish.*



Photos by CARL ROESSLER





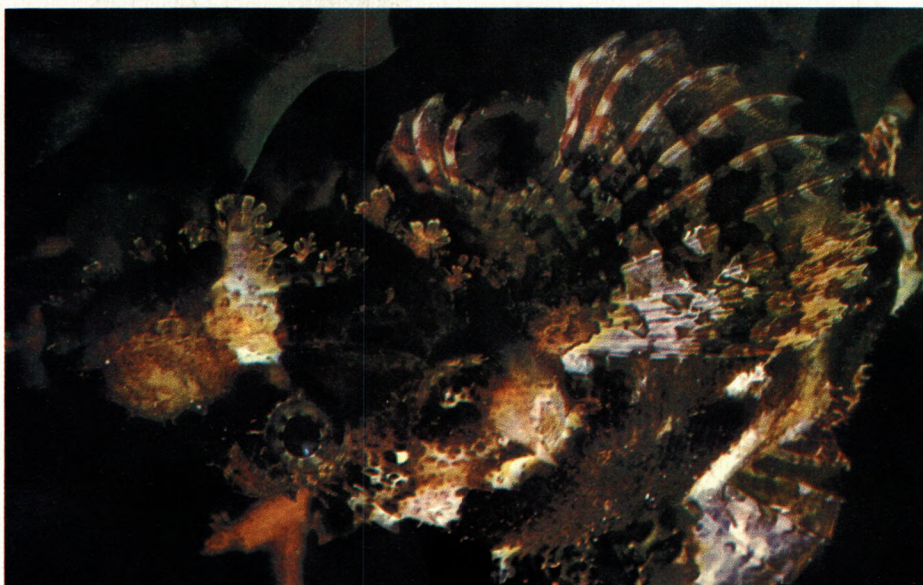


Sport Diver





*Outrigger canoes called bancas provide transportation for nearly everyone who lives near the sea. Large bancas carry supplies such as rice and sugar, or are used to set out wicker fish traps.*



*Local fishermen free dive to gather small reef fish for bait. Four divers drag a net over the bottom, staying submerged up to a full minute on one breath. The vertical drop offs provide cover for the scorpionfish (above) and support many large sponges.*

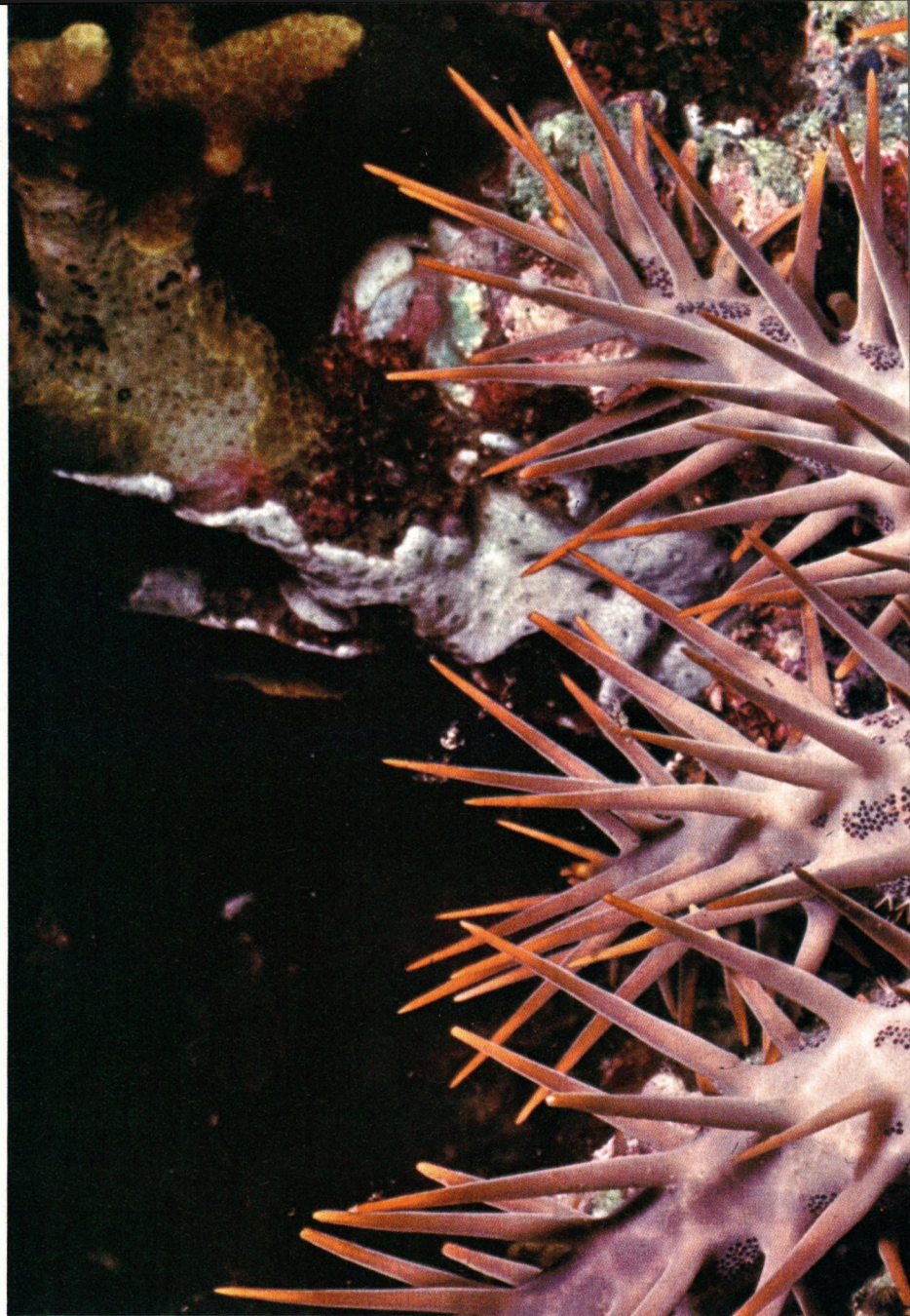
feet, and on the other Australian-type bommies — huge coral heads spotted over the bottom in 20 to 30 feet of water. The whole staggering array of Pacific marine life confronts the diver; clusters of staghorn coral interspersed with forests of flowing soft coral branches and giant sea anemones. Along the vertical drops crinoids grasp firmly to the walls, their feathered arms extending towards the open







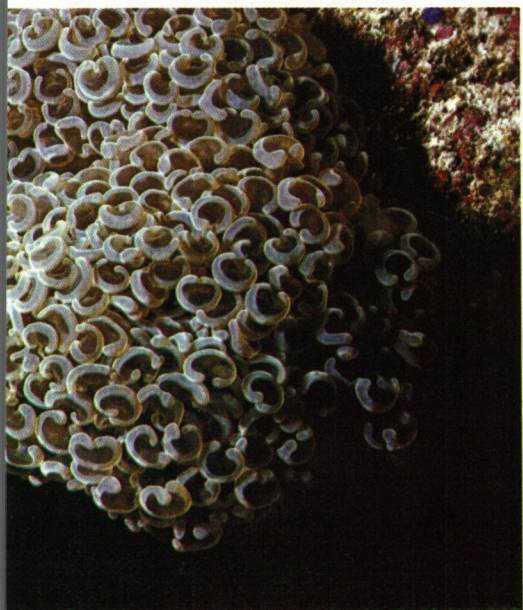
sea, sifting the rich waters for food. Brilliant red, yellow, or black with yellow stripes, the crinoids seem to dominate these tropical waters, adding color and excitement to dive sites throughout the Philippines. Lionfish are very common and often may be seen perched behind or under a coral outcropping, their quill-like venomous spines fully extended. Although its sting is quite toxic, the lionfish is not aggressive, and



*The crown of thorns starfish (opposite page) is both dangerous and destructive. These reef dwellers eat coral, contributing to the degeneration of Pacific reefs.*









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# Philippines

## WHERE ASIA SMILES

*continued from page 73*

confident of its defenses, will simply move away slowly when disturbed, making it an excellent subject for fish photography. The highly visible lionfish has a toxic relative in these waters, the well-camouflaged scorpionfish, which is almost never seen until the sponge-like object you're looking at begins to move.

Besides these exotic cousins, the common Pacific fishes flourish here: Imperial Angelfish, anchovy, butterfly fish, clownfish, and fairy basslets. There are also many unique shells; some of the rarest and most valuable shells are native to the Philippines. Transferring to the beach at Balicasag via a native banca (outrigger boat) we found the villagers had beautiful shells they were willing to part with. Visitors are an uncommon occurrence, and each landing brings out a horde of inquisitive children. Their smiling faces, the warm beach and unhurled pace are a sunny complement to the many island paths that wind through verdant subtropical forests.

Another trip in the banca and we're back aboard the *Seaquest*. This 102-foot boat has many necessary features such as semi-warm, fresh-water showers and a complete galley. There are 20 double bunks on the main and upper decks; comfortable berths with excellent ventilation. The *Seaquest* is also equipped with a large platform for diving right off the boat, and which always has someone on it to remove and handle your bulky gear when you surface. The equipment is quickly moved out of your way and placed in freshwater soaking tanks. The crew has had a lot of experience with costly photo gear, and handle it with due caution.

Taking off from Manila, the picturesque islands recede beneath the wings of the Philippine Air Lines jet. With them go memories of the markets of Cebu, rice paddies, fishing villages, native divers, smiling people, the outrageous re-born Army jeeps (the Jeepneys), and so much more. Up to now the Philippines have only been a glimmer in the American travel diver's eye, but this adventure is becoming a reality for more, thanks to Philippine Air Lines' recent fare reduction. At less than \$600 round trip, it's the best deal going to this part of the world. Those who make the journey will not go unrewarded: the richness of the Pacific marine life, foreign culture and friendly people will stay with them forever.

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## RESORT UPDATES

### Bonaire

Peter and Alice Hughes have purchased the former Teach/Tour operation adjacent to the Flamingo Beach Hotel and have renamed it "Dive Bonaire". In addition to the name and ownership change Peter and Alice have made several improvements in the store equipment. Two dive instructors have been added to the staff so that the operation can now handle as many as 50 divers at one time. A photo shop with film, rental cameras and first aid for flooded cameras is located on the premises. Peter has also added a fast 30-foot boat to extend the range of divers aboard his covered flat top trimaran.

### Kailua-Kona Hawaii

Hawaiian Divers on the Kona Coast has just competed a "major overhaul" under the direction of a new management team. Kit McNear, the new Director of Operations, said that all aspects of the facility have been expanded substantially.

### Bonaire

Underwater photographer and guide Bruce Bowker has rejoined the staff of Cap'n Don Stewart's Aquaventure/Habitat in Bonaire after a year leave of absence. Bowker will head up the newly created photo department of the operation and will be responsible for helping visiting divers improve their underwater photography.



# See & Sea's World-Wide Diving Adventures

## •Cozumel, Mexico

7 days — \$600.00 Plus Airfare  
Departures 1/21, 2/18, 3/18, 4/15,  
5/13, 6/10, 7/08, 8/12, 9/09, 10/14,  
11/18, 12/23

## •Australia/Coral Sea

17 days — \$2000.00 Plus Airfare  
Departure 10/10

## •Galapagos Islands, Ecuador

18 days — \$2000 Plus Airfare  
Departures 3/12, 6/25

## •Tahiti/Outer Islands

14 days — \$2000.00 Plus Airfare  
Departure 6/02

## •Cayman Islands

7 days — \$600.00 Plus Airfare  
Departures 1/14, 2/11, 3/04, 4/08,  
5/06, 6/03, 7/01, 8/05, 9/09, 10/21,  
11/18, 12/23

## •Micronesia/Truk Lagoon

12 days — \$800.00  
(Ponape extension available)  
Departures 3/14, 3/26, 4/07, 5/05,  
6/16, 7/17, 7/21, 8/11, 9/08

## •Philippines Islands

16 days — \$1,800.00 Plus Airfare  
Departures 3/25, 4/08, 5/27

## •Red Sea — Aqaba, Jordan

15 days — \$2000.00 Plus Airfare  
Departures 5/13, 10/14

## •Belize/Outer Islands

7 days — \$600.00 Plus Airfare  
Departures 1/28, 2/25, 3/25, 4/22,  
5/20, 6/17, 7/22, 8/19, 9/23, 11/04,  
12/02, 12/23

## •Australia/Great White Shark

16 days — \$4,400.00 Plus Airfare  
Departure 2/10

## •Virgin Islands

7 days — \$600.00 Plus Airfare  
Departure 1/21, 2/18, 3/18, 4/15,  
5/13, 6/10, 7/08, 8/12, 9/16, 10/28,  
11/25, 12/23

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# WORKING DIVER

Can You Really Make A Bundle As A Professional Diver?

By Mavis A. Hill  
Admissions Director  
Commercial Diving Center

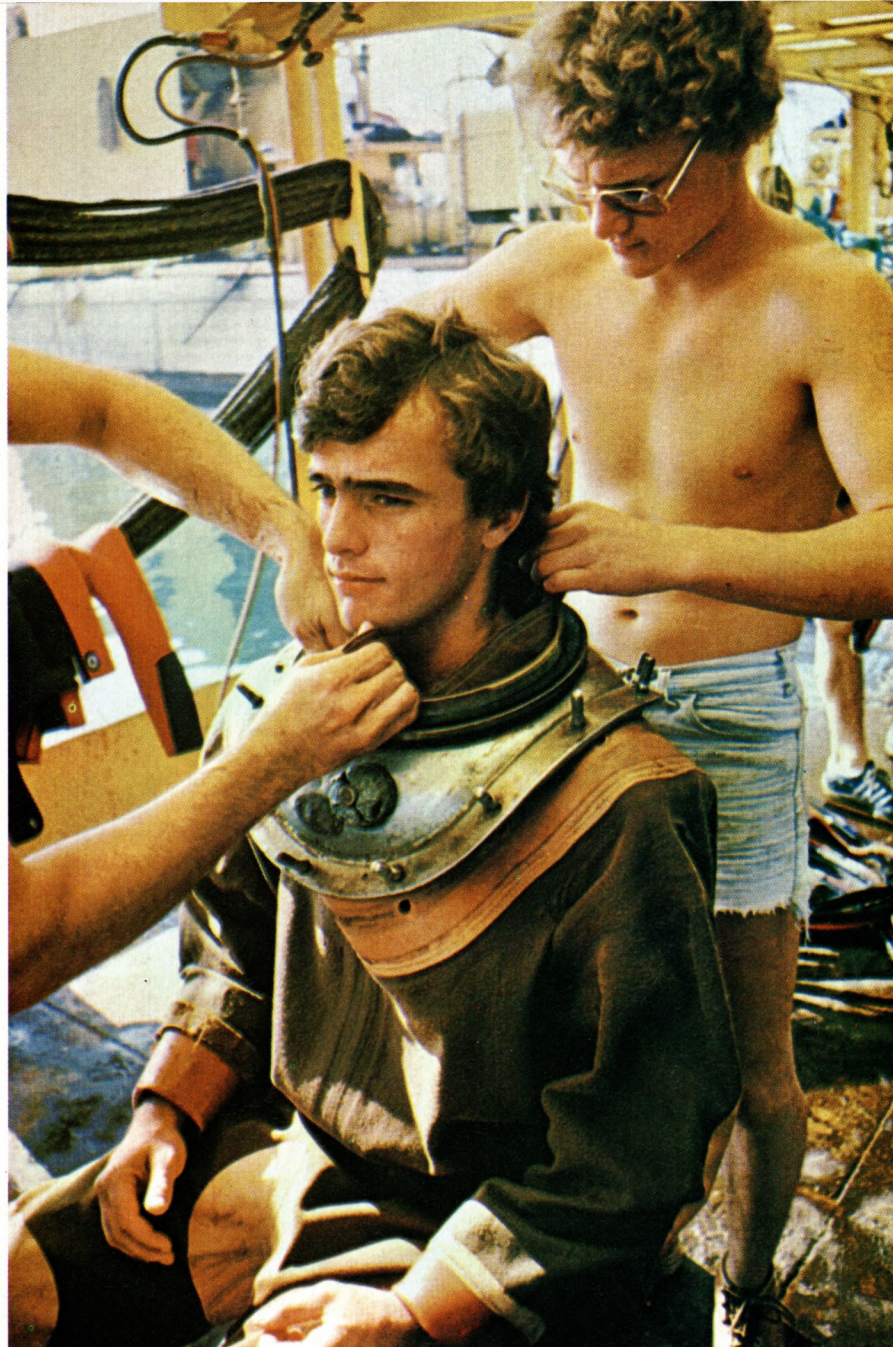
You're probably already half convinced it's possible for you to get rich quick in commercial diving, or you wouldn't have read past that title up there. If you've utilized the commercial diving school ad coupons, and are ogling school brochures, you're hooked — you've got a mental image of yourself stalking the bottom of the sea in hardhat gear, working on your second million for that foreign bank account.

Those school brochures, however, still leave a lot of questions bouncing around in your head, and you'd sure like to sit down with someone you can trust; someone who will give you dependable, realistic answers about your qualifications and what to expect in the deep sea diving business.

You're not alone on that. It works both ways. It is impossible for the schools to include every answer to your questions in a brochure, yet it is just as important to us as it is to you that you have an unquestionable attitude toward the profession from the start — before you begin your training. Therefore, we in the business of commercial diver training are also anxious to talk with you, face to face. Diving contractors depend on the schools to make sure you obtain the straight facts. It is our obligation, as well as to our advantage, to produce men who are not only skilled in the mechanics of the business, but who are psychologically ready for the job they are expected to perform in the field.

Obviously, it's just not possible for the schools to meet and talk with every prospective student prior to his enrollment. Though many of them do travel quite a distance to tour the schools, most of the students enroll by mail. They send applications to us from every state, and from dozens of countries all over the world.

Those who feel they can afford it will call from great distances, just so



they can talk about the business or their qualifications for deep sea diving work. For example, we have had many calls from Australia, New Zealand, England, and Norway, and dozens each month from inside the United States and Canada. After all, a call does help a great deal, and is much cheaper than traveling that same distance to visit our schools in person.

Not many of you can afford such long distance contacts, especially when you are saving for an expensive diving course, plus travel funds and subsistence finances while attending school. So there's only one other way a school counselor can, in effect, get together with you for an informal, person-to-person discussion. And that is to cover the ground through a medium

with national distribution that is easily available to all of you.

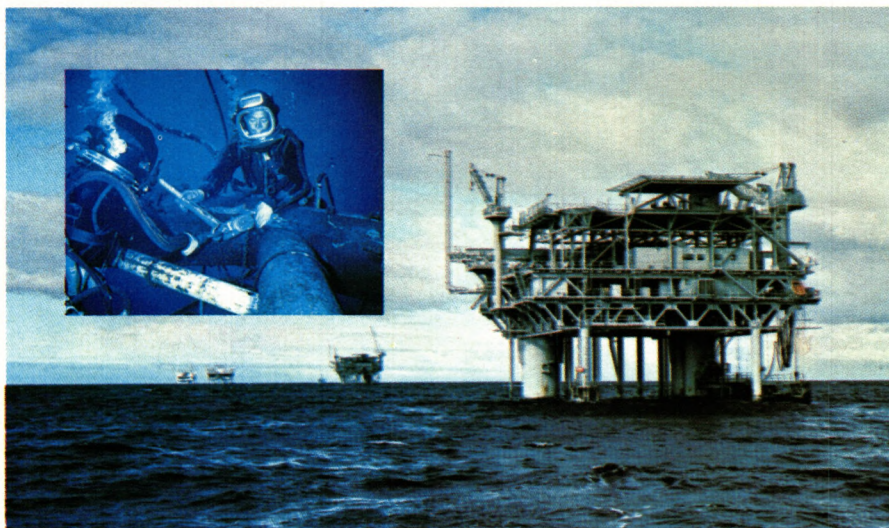
This, then, is the purpose for this article. You can trust what you read here. You can depend on the facts in the following discussion just as though you were sitting with a counselor at a reputable commercial diving school. You're going to get some hard-rock, honest answers, just as our counselors would give them to you, were you able to visit the school. So read on.

## The Big Myth

The biggest myth about commercial diving is that you're going to dive in clear, blue-green water, yelling "Whoopie!" into your helmet as you gather up ancient golden doubloons and silver ingots. You won't surface from your dive to sit around topside showing



# THE ROCK BOTTOM FACTS



Deep sea diving gear is cumbersome and heavy; divers must be dressed by other workers while seated (left). Offshore oil rigs like these (above) are the staging area for a variety of complex underwater jobs. Two CDC graduates, Leif Simcox and Ron Archambault (right) perform some intricate, but routine, maintenance for their contractor.



your hard, brown body to a gal in a wet T-shirt while you count your loot. If you believe that, you still believe the girls just automatically crave your body because you've stopped using "that greasy kid stuff".

Speaking of grease, that's what commercial diving is all about — OIL — at least if you're after big money. There just "ain't no such thing" as treasure in the real world of diving. "Treasure diving" belongs to the rare man who is a modern day soldier of fortune, who, like the early '49er, spends half his life seeking financial backing from someone with a zinger of a gambling spirit, and the other half blowing sand with a prop-wash gadget. There have been just *three* divers in you and your father's lifetime who have made a

"strike" in that dream world. The earliest was the late Kip Wagner, who found a very lucrative "glory hole" in a Spanish wreck off the now Cape Kennedy area in Florida. This cache actually began on shore, where he found several pieces of eight, then followed them into the sea. His find was very rich and he made a whole business from it for the rest of his life — a company called Real Eight, which some of you may know about. Today we still have Robert Marx and Mel Fisher. Bob Marx does all right, but he's made most of his money from the 14 or 15 books he's written on the subject. Mel Fisher, as you know, recovered some loot, after many frustrating years of searching, and some tragedy. Well anyway, Bob and Mel have hard, brown bodies.

## Dramatic, Hard Work

Commercial diving is a dramatic business. Making M-O-N-E-Y, and lots of it, is the plot in this drama. The characters are the oil companies, the diving contractors, and you, the diver. The whole cast is on stage 24 hours a day, 365 days a year, drilling for offshore oil. The parts they play are rough and competitive, everyone trying to get into the limelight, while the divers themselves upstage each other for the better, higher paying parts. The stage is terrible.

Not only is the diving business itself cold, rough, and dirty, but so is the water. You will work a 12-hour on, 12-hour off shift for weeks at a time, in the lousiest diving conditions imaginable. You will build, maintain, and repair rigs in foreign countries, way out at sea and deep into it, no matter what the temperature, what color, or how rough the water. You will weld, fit pipe, excavate, search, and lift, using any kind of tool that will do the job — some of them as big as you are.

How are the women in those foreign countries? You'll probably never know, buddy. You're going to be too busy resting in a dust-pit onshore during your time off. Yeah? Then why in God's name does anyone pick such a rotten way to make a living? Ask any working diver. He'll look you straight in the eye and grin, "Money, man — M-O-N-E-Y!"

## What Color is the Money — Really?

The subject of what you're going to make in this business has to be introduced with the fact that you must be well trained by a school that the diving contractors respect before they'll even talk to you. The work they do runs into the millions every hour, so time is of the essence out there. Gone are the days when the diving contractor hired "off the street," then spent time and money with on-the-job training. So you're going to have to go to diver's school first — a good one.

Now — know this and believe it: Depending on which school you attend and if you take advanced courses, it will cost you from \$4.50 to \$13.00 an hour to train, but you're not going to make that much the first year you're on the job. There you are, a well trained diver,



listening to some big diving contractor offering you maybe \$12,000 or \$15,000 as a tender. That's a lousy \$2.92 to \$3.42 an hour.

"Hell," you complain, "I made a lot more on my old job topside!" Sure you did, but where was it leading you? Why did you leave that job? You left because the school counselor told you that as soon as you prove to the contractor that you are a knowledgeable, hardworking tender and that you can follow orders, he may offer you a "jump" (drop you in the drink) after only a month or two. His policy is to keep you topside for six months to a year — but he needs you *now* and he likes you. He knows you'll make money for him, so he'll push you down there where your money is. Until then, you'll be a deck swabber, a "gopher", and a clean-up, fix-up boy. Once you hit the water, your bankroll will be spiraling up while you're bubbling down.

The second year, you'll double your income, and if you keep yourself employed — you'll be making upwards of \$35,000 in the third year.

Lots of letters from grads are received by the schools. They bring us news, of course, and almost all of them tell us how happy they are with the money they're making. But the letters that make us happiest are like this one from a man who had graduated just a little over a year before. He said "I can hardly believe it at times, but I'm actually approaching the \$50,000 a year income bracket!" That kind of a letter is not common, but neither is it rare. Don't expect it, just be ready to work for it.

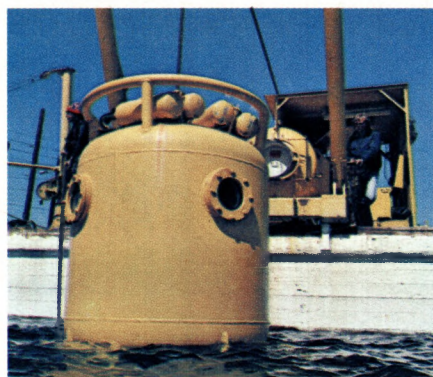
Do all divers make big money? Of course not. Some choose to work for harbor or inland based diving companies. Union wages are fair if a diver is with a union shop, but sea urchin picking and bridge repair just are not oil!

### **Could the Diving Market Become Saturated?**

Sure it could — if every diver stuck with it. If they did, in maybe ten or fifteen years the schools would have trained all the divers needed. The fact is that about 10% drop out the first year because they can't stand the life. When it comes right down to working 12 hours a day in muck, cold, and sludge, taking orders from some squeaky voice topside, it isn't worth it to them. Another 20% give up during year two because they begin to hate the competition, or feel for some reason they're being discriminated against by someone. And would you believe another 10% take a \$2,000+ diving course, then go home, hang their hardhat picture on the wall for the girls to see, and open a supermarket or shoe store? God knows why. The some who do hang in there eventually get tired — or scared — and go for supervisory or



*Drilling (above) and welding (opposite page, top) underwater are skills that must be entirely re-learned, even if you can perform them expertly topside. The school you attend should own and utilize a complete practical bell diving system (below).*



administrative positions with their company.

The turnover of men actually diving out there at any given time is phenomenal. Therefore, there is a constant condition of demand by the diving contractors. These contractors tell us that we have to train more than 3,000 divers in the next three years to meet their needs. Our school trains more students annually than any other, yet we can barely squeeze out some 300 graduates a year. And, again, remember the number of dropout grads. You can believe with confidence that the diving

market will not become saturated under the present oil crisis conditions. Furthermore, even the inland and harbor based diving companies are in need of more divers all the time. The new Occupational Health and Safety Administration (OSHA) regulations now require such additional equipment and specialty skilled personnel on diving operations that city and county governments can't afford their own diving departments. Thus they are contracting their work out to established, private companies.

### **Well, Then, How is the Hiring?**

Hiring conditions can be explained this way: There are 357 offshore oil rigs working out there right now, at this writing, and an estimated 23 more presently to come. As many as 70 new underwater pipelines will have to be constructed in the near future in the United States alone.

At the end of 1975 in the United States, there were around 800 active divers, and 5,000 more will be needed, worldwide, by 1980. At present there is a total of about 2,000 divers — and there's always that dropout rate. Do they need you? You bet they do.

Most schools are experiencing from 60% to over 80% hiring on a steady basis, with periods of higher job placement during good hiring seasons. From January through September of 1977, our school experienced 100% hiring. The traditional slow hiring season between December and March, which is due to the bad "weather window" that time of year, was simply non-existent in 1977. Divers are needed so desperately that it seems we can no longer always depend on traditional hiring "seasons". It's a whole new ball game.

For further evidence, witness this quote from the *Newsletter* in the October 1977 issue of *Offshore Magazine* — the "granddaddy" of commercial diving periodicals:

"... The increased emphasis on worldwide jacket and wellhead maintenance programs has taken the slack out of the commercial diving labor market. For some years a moderate percentage of divers had difficulty finding jobs in the petroleum industry, but the market improved suddenly this year. One California school reports that demand currently exceeds the number of graduates. Until other forms of underwater maintenance can improve on the diver's visual observation, the demand is not likely to slacken." That "California school," incidentally, was CDC.

Your next question should be "Where are the jobs?" This can be answered by telling you where the rigs are. Right now there are 69 in the North Sea, 128 in North American waters, 47 in the Middle East, 48 in Latin America, 29 in Southeast Asia, plus many spread through Africa, Australia, Canada,



Japan, the Mediterranean, Europe, Mexico — you name it, you can work there. You can slosh around in water of less than 100 feet of seawater (FSW) at inland and harbor areas of the United States, or dive in 300 to 1,000 FSW in the offshore oilfield environment. The deeper you dive, the more money you're going to make (and the more advanced the training you must have initially).

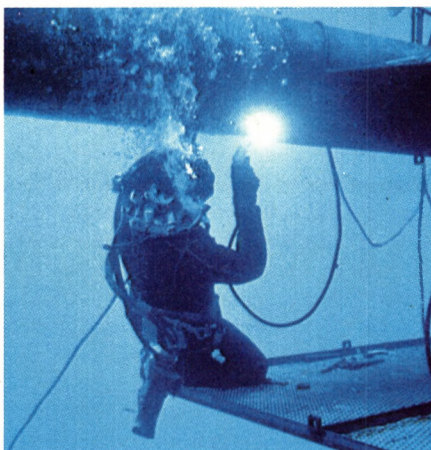
### Isn't Deep Diving Pretty Dangerous?

Generally speaking, the more risk-free the job, the smaller the salary. No one has to tell you that. And yes, commercial diving is dangerous to some degree. So is firefighting, and police work. The highest risk job, according to a recent insurance company survey, is firefighting, yet the salary for this is lower than that for oilfield diving. And diving companies themselves insist on the lowest accident rate possible. Despite the insurance and OSHA regulations, which are stringent, it's the diving companies who really care about keeping accidents to a minimum. If their work runs into the millions of dollars every hour, what would you guess even a minor diving accident costs them? You guessed it — it runs into the multimillions. Every minute of wasted time when nothing is accomplished except getting the injured diver to the surface and tended to carries an exorbitant price tag on it — with no work done and red figures piling up in the account book. Accident reports are thinning out a great deal nowadays, and you can depend on the offshore oil contractor to look after your welfare with an eagle eye. Maybe the biggest risk on your present job is getting your finger caught in the time clock, and that's o.k., if you're satisfied with the color of your money. But you'll go for commercial diving because it has some risk — that's why it's lucrative!

### Your Start to the Mother Lode

Oops! You haven't been listening. All this terrible stuff either doesn't worry you, or it will happen to "the other guy," and you still plan to make a career of diving? Okay, then, down to the basics of getting started, which consist of your own personal qualifications, and the school you will choose.

You will have to be 18 or over, but if you're older than 32, you'd better forget it. You won't have time to convince the contractor you're worth paying the terribly increased rates that the nervous insurance companies will demand after you're 35. Also, you must have a high school education, or the equivalent, before you begin your training. Of course you'll have to be in good health and will be required to pass a physical for the school, and most likely another one for the diving contractor who hires you later on. The doctor will judge you on your physical and mental predisposition for diving, not for your broad shoulders and big



muscles. One company may be looking for a little guy who can crawl through, or under, a pipe, and another may want someone built like a gorilla who can lift that same pipe for them. So your size makes no difference. Just because you're big enough to go bear hunting with a stick doesn't necessarily make you the diving contractor's dream; and gross *overweight* is a no-no.

If you fit the picture so far, look to your mechanical skills. A commercial diver is a mechanic — pure and simple. He merely dons his own crazy transportation system to get himself to

his work site — underwater. Therefore you must have good mechanical skills, or a whammy of a potential for them so we can bring this potential into focus during your course. Diving contractors are crazy about welders who have done a lot of topside welding before learning the skill underwater. Welding and pipefitting is what this game is all about. Contractors also like married men because, they say, they're inclined to be more steady . . . but you should know that your *marriage* probably *won't* be. Few women will put up with the kind of absenteeism from home that is necessary for a diver. It is said that the divorce rate in offshore oilfield diving is higher than that of the Strategic Air Command!

### The Right School

A school that gives you your money's worth should offer a practical course of air and mixed gas under one tuition. "Inexpensive" air-only courses are virtually worthless unless you wish merely to scoop up sea urchins at 4¢ a pound. Mixed gas is essential, for offshore oilfield contractors won't want to talk to you until you are well trained in this. Most diving is so deep nowadays that it's impossible to work without using a mixture of breathing gasses.

Make sure your mixed gas training is included in the price quoted. You may find out that the tuitions for air and mixed gas courses separately are going to cost you more than if you attended a school that gave you both in the same course, under a single tuition.

A good school also provides *practical* training in *all* their courses, including bell and saturation. Some advertise "bell training", when they actually teach theory-only in bell and sat diving.

It is best if you can attend a school that offers topside welding free of charge, preferably clear through to welding certification, if you wish to take advantage of it. In line with this, be sure you know exactly what subjects you will get in your courses. Such things as diesel maintenance and repair, rigging, salvage, decompression and treatment tables, underwater demolition, subsea drilling, pipeline construction, dredging, studies in industry and government diving regulations, and first aid to include CPR, to mention a few, are all musts. Be sure you study the school catalogs thoroughly, for comparison and for determining that all the skills you, and the profession, require will be included in your courses.

When you talk with the schools, watch for certain superlatives or grandiose statements. If, for instance, a school says they *guarantee* you a job on graduation, head for the door. They are telling you this illegally, for one thing, as no one can guarantee placement. If they tell you they will do all they can to place

*continued next page*



# WORKING DIVER

continued from page 79

you, find out what they actually *will* do. Make them show you evidence that they send out your background to all diving companies, not just a few. This is a service that the best schools conduct between themselves and the contractor. They keep in constant contact with the contractors, and the contractors seek the school regularly, as a result of the background mailings, and not just when the contractor is desperate for someone — anyone — to roll up a hose for him during a very busy season.

Make sure you will actually use the training equipment the school boasts of having at your disposal. Some schools will show you all kinds of fancy equipment, but when it comes right down to the training, you'll wonder what happened to all of it. This kind of a school will have plenty of big stuff lying about to show prospects, but unless you talk to the students, you won't know until too late that this equipment is gathering rust from lack of use.

The school should also have an ample number of full time instructors to give you individual attention. Don't discover too late that the six or seven

instructors they advertise are two full time, and four or five who come in to lecture once or twice during your course.

It is important that you talk to in-house students, and to working graduates of the school you're most interested in, if this is possible. They won't lie to you. The in-house students are the first ones to give you a thumbs down if they have been "burned", and the graduates know from experience which schools are the best, no matter which one they themselves attended. They have been out there on the rigs and know which schools send out the best men. You can trust the working graduate, because you may be the guy they're going to have to dive with down there — and they want you well-trained!

If a school tries to tell you that almost every diver in the field was trained by them — it just isn't so. Use your head and wonder what happened to all those other schools' graduates, when the Veterans Administration reports that they have acceptable hiring rates. In order to be, and continue to be, approved by the VA for educational benefits, a school must prove beyond the shadow of a doubt that their hiring rate maintains a level set down by the VA.

Don't listen to "smear" tactics used against other schools by one you're talking to. Reputable schools don't have to resort

to this kind of backbiting.

You're putting a hell of a lot of money into this business, so do your best to contact and ask the diving contractors for their advice on schools. Esteemed schools are overjoyed when you do this!

Remember that just because a school boasts of being "the oldest," or having the most diversified courses, or claims to be accredited or approved under various government student financial aid programs, does not make it the most reputable school or the one with the highest quality courses. Age is not synonymous with quality in any facet of life, and diversified scheduling of courses can mean "a little of this and a little of that", which, when put all together, can cost you too much. Lastly, whereas being approved by the Veterans Administration is a basic that any school should be able to claim, some schools would rather not bother with the complications of handling such things as the Basic Education Opportunity Grant (BEOG), and it is no reflection on the school that they are not approved for them. Then, too, ads that list certain financial aid programs can be misleading, as your may find out that one or two of these is no longer available. The Manpower Development Training Act (MDTA), for instance, has been defunct

continued page 90

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Here's \$1 to cover costs. Please send me your catalog of courses and other literature about commercial diving career training.

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The background of the advertisement is an underwater scene. In the lower right, a diver's mask with a red strap and a silver snorkel are visible, partially obscured by shadows. Bubbles are rising from the diver, creating a sense of movement. The water is a deep blue, and the lighting is dramatic, with light rays filtering down from above.

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when you can have it  
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***SPORT DIVER***

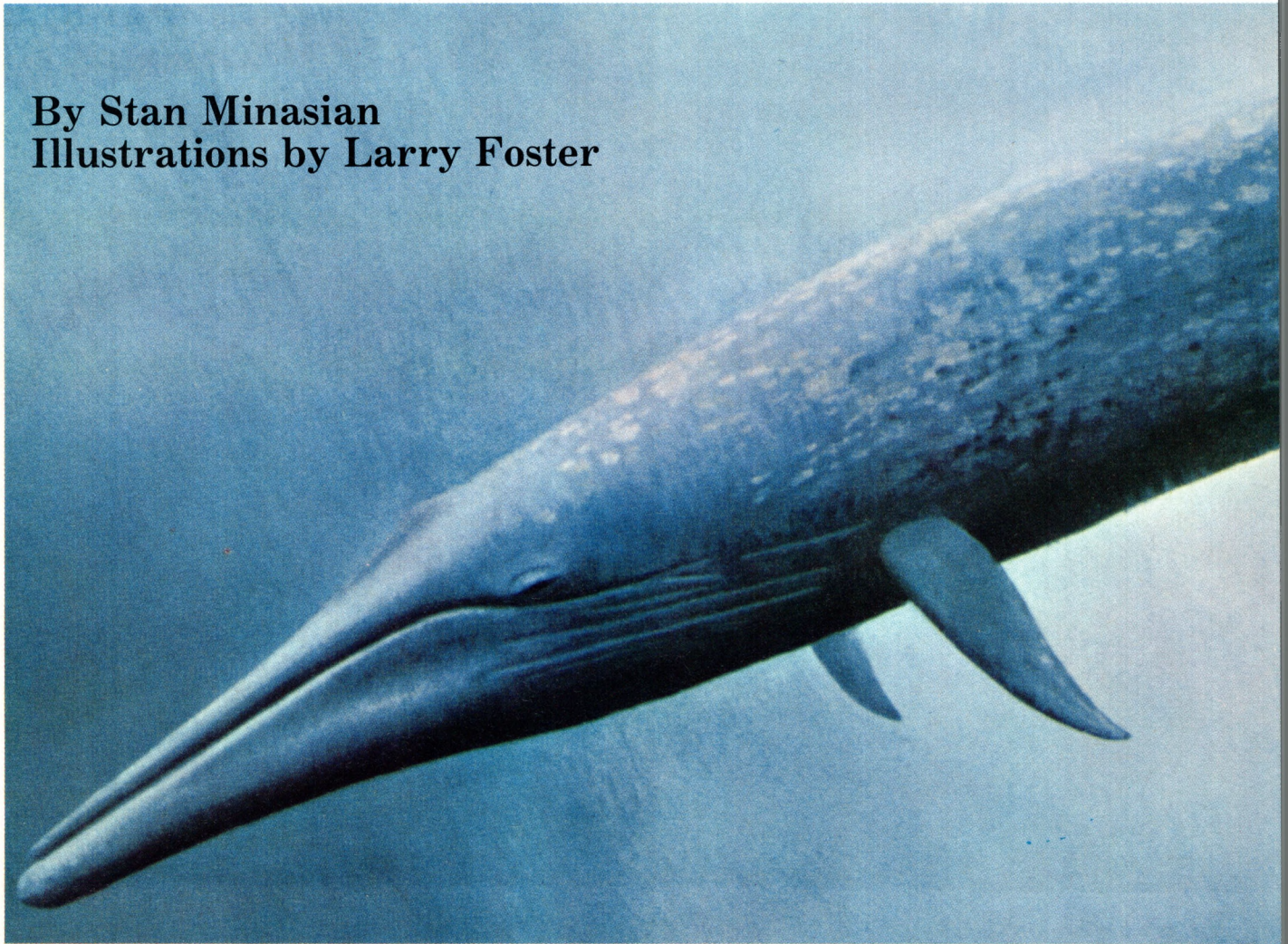
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# THE SUBJECT

By Stan Minasian  
Illustrations by Larry Foster



Hardly a month goes by that one or another of America's great magazines does not do a piece on whales or dolphins. In this era of environmental concern and commitment these magnificent and enigmatic creatures have captured the hearts and imaginations of people all over the world. From Maine to Australia, Britain to China, Alaska to Argentina, bumper stickers and tee shirts are spreading the word that whales and dolphins must be spared from man's industrial intervention. What is it about these docile and incredibly well adapted creatures that so inspires us? Are we envious of their carefree and gregarious lifestyle, their freedom, or their mystic and prodigious intelligence? Is their peaceful and benevolent existence a surrogate diety to many of us who are religious iconoclasts? Do we have the right to

exploit them so violently or to allow the minute percentage of contemporary whalers to dictate the life and death of a species? Before we can answer these kinds of questions we must first ask ourselves if we truly understand what whales really are and, more importantly, what function they serve in the delicate marine ecosystem.

Information on these animals is sketchy to say the most, and practically non-existent to say the least. Most of us are aware that some whales are large while others are small, some are light in color while others are dark, and that they live exclusively in the water while we are terrestrial creatures. By eliminating the fraction of one percent of the population which knows a bit more, it is clear that knowledge about whales and the proliferating movement to protect them do not correlate.



# IS WHALES. I

## SEACIOLOGY

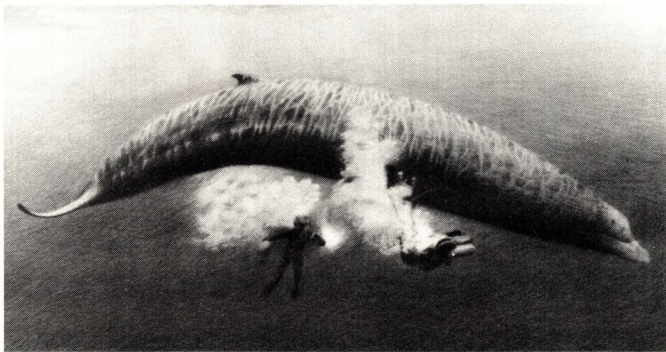


Hopefully, more education will increase the potential of public concern for the whale, and their continued and strengthened protection. So from here on in, the subject is whales.

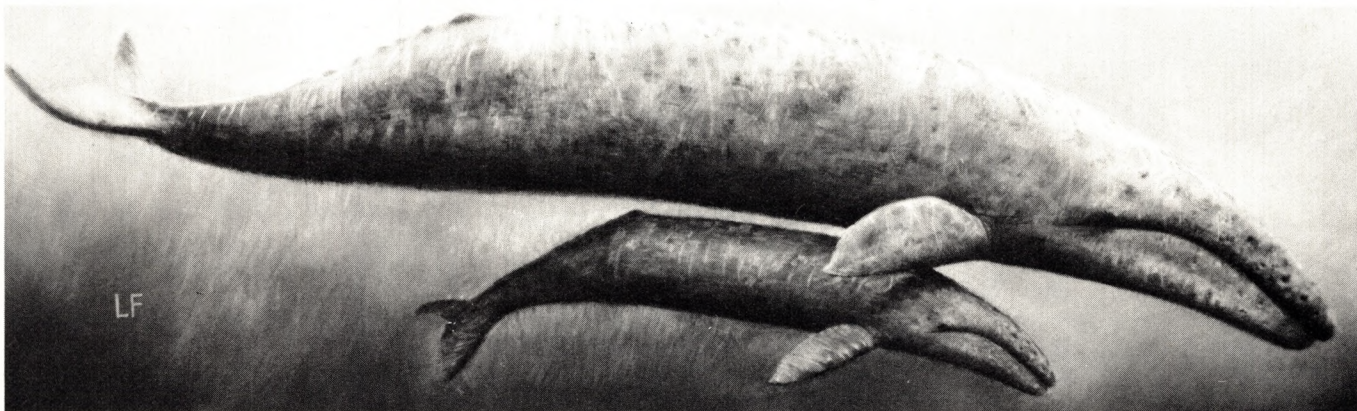
Who knows how many as yet undiscovered creatures there are swimming the strata of the ocean depths? The turn of the century discovery of the coelacanth, a fossil fish thought extinct millions of years ago, or the more recent dredging up of a decomposing plesiosaurus in the Indian Ocean proves that our marine sciences are just now emerging into the budding stages; that when we arrive at the point where we feel we have a grip on the basic workings of the ocean, we are reminded that this particular field of science transcends conventional labels of questions and answers, problems and solutions, theories and conclusions.

To our knowledge there are at least 80 varieties of whales, dolphins, and porpoises. Although we have attempted to define these animals by shape, color, and skeletal variations, it is nevertheless impossible for all researchers to agree on the matter. In fact, very few agree on anything. The more research one does, the more infinite the confusion there is to deal with. Are there really differences between dolphins and porpoises, or is the difference merely semantics? Does True's porpoise really exist, or is it in reality a Dall's porpoise with a slight color variation? Do dolphins and whales really perform interspecies communication, or are we arrogantly dismissing this sacrilege even though evidence suggests its likelihood? These questions and thousands more like them enshroud the cetaceans in an envelope of



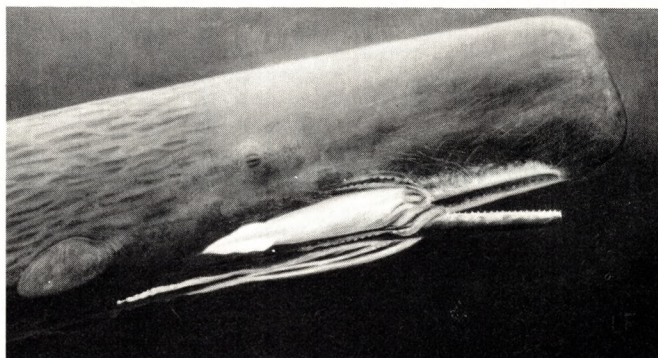


*Larry Foster's renderings of whales embody some of the mystery that is symbolized by the word cetacean. The beaked whale (left) and gray whale (middle) are not as commercially valuable as the sperm whale (below), and so are hunted less frequently.*



mystery, an envelope which will not and cannot be opened by science alone. There is truly more here than meets the eye, and that in itself is the confusion which is synonymous with the word cetacean. The subject of whales is a mysterious one, as elusive as the definition of a quasar.

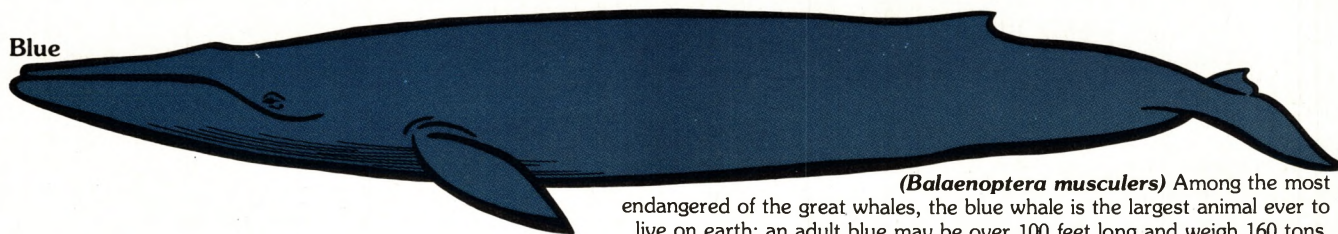
The great whales are the largest animals ever to inhabit the earth. The blue whale grows to lengths approaching 100 feet and the fin whale is not far behind. Their appearance is in fact rather thin and streamlined compared to the blubbery and amorphous renditions found in just about every book on the subject. There is a reason for such inaccuracies though, as few of these giants have ever been observed or filmed underwater. Blue whales, for instance, are so rare from years and years of uncontrolled slaughter that confirmed observations take place less than a dozen times a year. Reports from scientists indicate that the herds of the North Atlantic are making a strong comeback, but it will be years before we can be assured of their continued survival. The fin whale, apparently the most numerous of the great whales, is still mercilessly hunted throughout the world by the delapidated Russian and Japanese whaling fleets. The humpbacks, rights, bowheads, and greys are listed as protected internationally, a small tribute when compared to the myopic philosophies which reduced their numbers so drastically to begin with. The minkes, seis, sperms, Bryde's and fins are the ones to think about every time the familiar saying is heard, "A whale dies every fifteen minutes." But to fight for the protection of an animal is to know something about that animal and the knowledge we have of these creatures is pretty much limited to size, color, yield of oil, weight, morphology, and distribution, hardly a fitting tribute to these symbols of environmental concern; or is it environmental desperation?



Once exclusively terrestrial mammals which moved, breathed, ate, and slept on the land, whales became incredibly well adapted for life in the sea. Exactly how the transition from land to water took place will remain a secret, even the most plausible theories are riddled with holes. The only aspect of the transition which we can state with reasonable certainty is that it happened rather suddenly, no doubt the result of dramatic climactic and geographical changes. Today, imbedded deep in the muscular tissue of cetaceans, isolated free from the spinal column, are vestiges of hind legs. The flippers, though smooth and paddle-shaped to the eye, are in reality made up of skin which covers a bony human-like hand. Of course, this transition took place so many millions of years ago that evolution has hidden nearly all traces of their terrestrial qualities, that is all but the most obvious. They must return to the surface periodically to breathe, for though their adaptation is certainly fish-like in appearance, they are still mammals in every sense of the word.

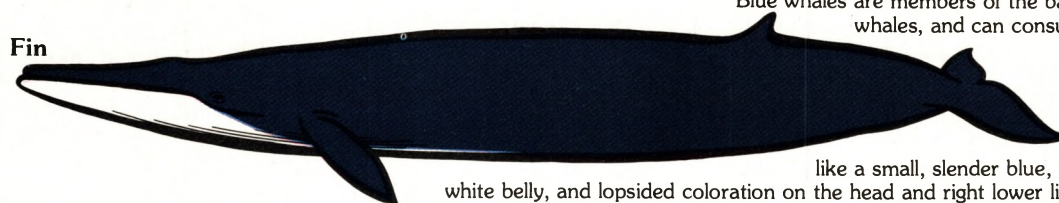
Whales, dolphins and porpoises are the subjects of one of the most intensive research efforts of our times. Their unique method of heat transfer, bio-sonar, laminar flow (the ability to move swiftly





Blue

**(Balaenoptera musculus)** Among the most endangered of the great whales, the blue whale is the largest animal ever to live on earth; an adult blue may be over 100 feet long and weigh 160 tons. Blue whales are members of the baleen, or whalebone group of whales, and can consume up to 8 tons of plankton and krill daily.



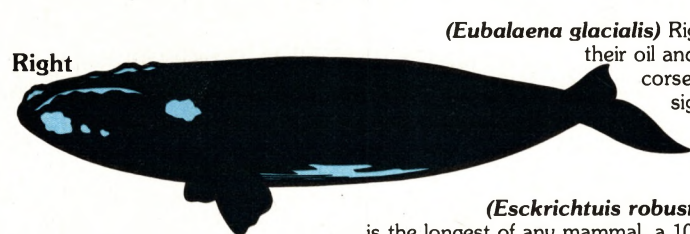
Fin

**(Balaenoptera physalus)** Second only to the blue in size, the fin, in fact, looks like a small, slender blue, but with a larger dorsal fin, a white belly, and lopsided coloration on the head and right lower lip. Although usually less than 75 feet in length, fins became the main target of whalers after the blue became scarce. His spout ascends as high as 20 feet, following dives that last 10 to 15 minutes.



Sperm

**(Physeter catodon)** The most numerous of the great whales, sperm whales are found in all oceans except those next to the polar regions. Containing the largest brain of any animal, sperm whales make dives of over a mile in depth, staying submerged up to 90 minutes. Generally they grow to 65 feet and may weigh 60 tons.



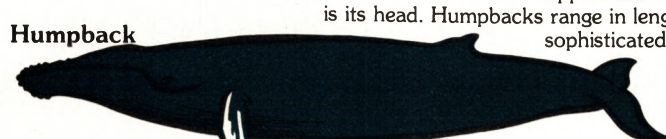
Right

**(Eubalaena glacialis)** Right whales have been hunted to near extinction in past centuries for their oil and exceptionally long baleen plates which were used in ladies dresses, corsets, and stays. The population of right whales has been slow to show signs of recovery. They were so named by whalers because they were the "right" whales to catch, very slow, floated when dead, and valuable. Attaining lengths to 58 feet and up to 72 tons, their mouths look as though they have been put on upside down.



Gray

**(Eschrichtius robustus)** The migration of the California Gray from the Arctic to Mexico is the longest of any mammal, a 10,000 mile, eight-month round trip. an endangered species and under increasing protection since 1937, the gray whale population has managed an encouraging comeback in the eastern Pacific. The gray is approximately 35 to 45 feet in length and weighs 15 to 20 tons, with barnacles and skin pigments giving these baleen whales a mottled hue.



Humpback

**(Megaptera novaeangliae)** Also one of the endangered species, the humpback suffered its greatest losses in the early 20th century. Migrating close to shore made it one of the easiest whales to hunt. Its wing-like flippers are about 1/3 of its body in length, and are covered with irregular knobs, as is its head. Humpbacks range in length from 40 to 50 feet, and weigh 30 to 45 tons. Their sounds are more sophisticated than those made by most cetaceans for communication, leading some researchers to believe that the humpbacks song is an intelligent language.



Killer

**(Orcinus orca)** Actually a large dolphin (about 25 feet), the killer whale hunts in packs. The only cetacean known to attack fish, seals, and occasionally a great whale, no record exists of a killer whale attacking a human. Killer whales have been studied more than most cetaceans as they are kept in number of dolphinariums. They are so cooperative and intelligent they can be trained without food rewards required by others species.



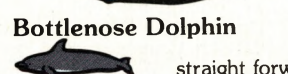
Pilot

**(Globicephala melaena)** Sometimes called blackfish, pilots can be found in all of the world's seas, and usually grow to no more than 18 feet. Schools of pilots may contain over 500 individuals and have a definite leader, hence the name, pilot. They have been known to beach themselves in a sort of mass suicide, a phenomenon which has not yet been satisfactorily explained.



Narwhal

**(Monodon monoceros)** Narwhals live only in the Arctic and grow to be 14 feet long. The male narwhal has a long spiraled tusk, actually a enlarged tooth, which projects up to 9 feet in front of it. The unicorn, a mythological horse-like creature with a horn growing from its head, may have been inspired by these strange whales.



Bottlenose Dolphin

**(Tursiops truncatus)** Bottlenose dolphins are very social, living in schools of up to 1,000 animals. Small, around 9 feet in length, they are familiar to many due to their extensive use in films and television. In addition to being the cetacean most adaptable to captivity, dolphins have peculiar social habits unrelated to straight forward mating activities, which supports the theory that they may be very close to man on the evolutionary scale.



## THE SUBJECT IS WHALES

through the water), and limited nitrogen saturation during deep and lengthy dives makes them the subject of a rapidly growing field of science. Though there is every indication that they are able to communicate with each other, even if only by a rudimentary system as suggested by many, the major research efforts focus on how man can best use their physical qualities in the improvement and refinement of his own industrial toys. By synthetically duplicating the qualities of the cetacean skin, and lining the hull of submarines, the efficiency of a vessel moving through the water is increased by leaps and bounds. Researching the ability of cetaceans to shut off the flow of blood to all but the vital organs during deep and lengthy dives will someday aid man in conquering the problem of decompression sickness. By studying the ability of cetaceans to transmit and receive sound waves of ultra low pitch, man might someday be able to use the canyons of the ocean floor for his own system of communication. One can safely bet that a majority of ongoing research in this field is predicated on exploiting the unique qualities of these animals and that proportionately very little is invested in their protection. This is strange indeed, for man in his endeavors to contact alien life in the universe might need to go no further than the sea shore, for it appears that cetaceans represent the perfect alien intelligence for the basis of this inter-species communication.

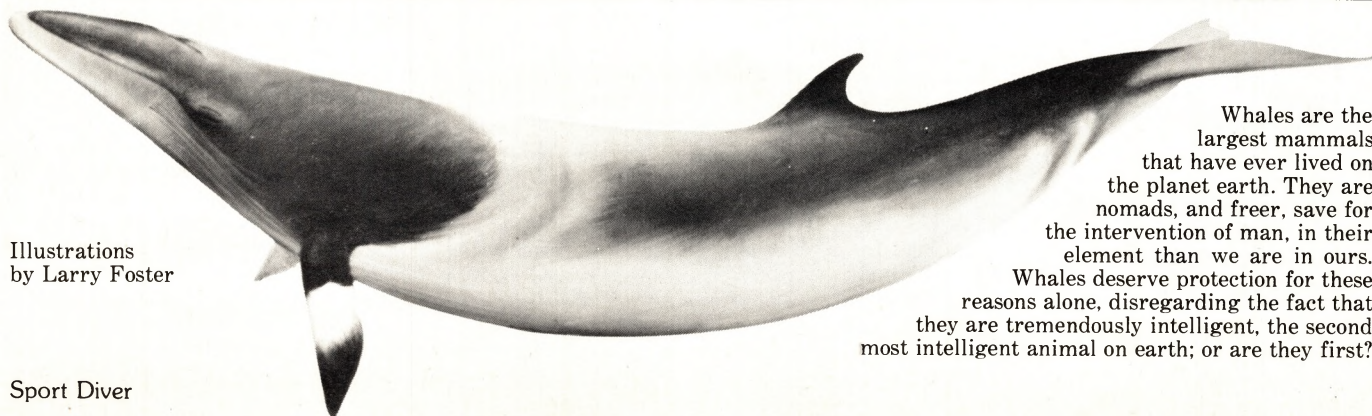
Whales, dolphins and porpoises are warm blooded mammals which have a life cycle very similar to humans. They give birth to a single calf on the average of every other year and nurse their young through mammarys which contain milk. Their gestation period lasts somewhere between 9 and 12 months and the young animals usually remain with their parents throughout their lives, though they are only dependant on them for a year or so. Most of the great whales travel in herds which are broken up into family pods. The pods can be scattered for many miles and someone on a ship in the middle of a herd might not be able to see a single whale. Mating and birthing nearly always take place in warm water regions. Some species are truly cosmopolitan in their distribution and may be found just about anywhere within their range at any given time of the year. Others like the California grey whale are migrating to or from a feeding or mating region nearly every day of their

lives, as the migrations are rather lengthy in distance and duration. If whales are warm blooded, how do they regulate their temperature for cold and tropical waters? The flippers and flukes are used not only for guidance but for heat dispersion as well. During the feeding months in the cold, icy waters of the Arctic or Antarctic regions, the warm blood flows down to the flippers and flukes from the heart. On its return trip, the blood flows through veins which are intertwined with the arteries. In this manner the returning blood is heated by the blood being pumped from the heart and the animal remains warmer with less heat loss. Migrations into regions of relatively warm water find the returning blood re-routed on a journey away from the warmer arteries. In this manner heat is lost through the flippers and flukes and prevents the animal from cooking internally.

For most of the great whales, feeding takes place in the cold, nutrient-rich waters of the Arctic or Antarctic regions. Baleen whales feed by opening their mouths while swimming and taking in tremendous amounts of water. The throat expands to five or six times the normal girth because of the grooves, or pleats, which run from under the tip of the nose and around the sides of the lower mouth to the chest or belly region, depending on the species. When the throat has been expanded to maximum size, the mouth is then closed but for the baleen plates which strain the water and trap krill and other nutrients. When all of the water has been expelled, the tongue gathers up the food for swallowing. The sperm whale, on the other hand, is the only species of great whale with teeth. Its diet consists mainly of squid, some up to 40 feet in length, which the whale dives to great depths to find. The sperm whale is perhaps the deepest diving cetacean. Its cavernous head is filled with sperm oil which is used chiefly for echo-location in the dark abyssal regions where its prey is found.

Cetaceans use sound more than sight to guide them around their marine environment, even though their eye sight is for the most part every bit as acute as mans. Some species of freshwater dolphins have no eyes at all and yet are able to move about unrestricted. This is because they use their echo-location as a sophisticated guidance system to "see". All cetaceans have a fatty region located at the forehead. They are able to generate

*continued page 114*



Illustrations  
by Larry Foster

Sport Diver

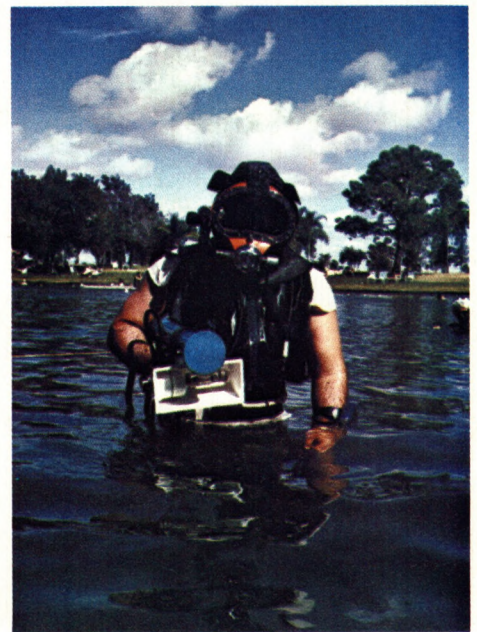
Whales are the largest mammals that have ever lived on the planet earth. They are nomads, and freer, save for the intervention of man, in their element than we are in ours. Whales deserve protection for these reasons alone, disregarding the fact that they are tremendously intelligent, the second most intelligent animal on earth; or are they first?





# Warm Mineral Springs

Story by Steve Blount  
Photographs courtesy of  
Florida Department of State





A group of mud bathers stands thigh-deep in the dark water of Warm Mineral Springs, a spring-fed sink a few miles south of Sarasota, Florida. They are here to exploit the regenerative powers of the spring, and are not interested in the diver who has just surfaced with a metal file cabinet containing the skull of a Paleo-Indian. The skull will eventually prove to be approximately 10,000 years old — among the very oldest reliably dated human remains in North America, and the first to be excavated underwater under tight archaeological control.

The man who recovered the skull, and a host of other bones and artifacts is Florida State Underwater Archaeologist, Wilburn A. "Sonny" Cockrell. As director and principal investigator of the Warm Mineral Springs Project, he has introduced a number of techniques to the fledging science of underwater archaeology. Cockrell's interest in Warm Mineral Springs was stirred soon after his appointment as state underwater archaeologist in 1972. Colonel William Royal, (USAF, ret.), and Dottie Davis, Sarasota County Historian, convinced Cockrell to come have a look in the Springs, where Royal had been finding well preserved remains of both animals and humans since the mid-1950's. The spring had been investigated before; in 1959, Royal took an NBC film crew on a dive in the spring. Pausing at a ledge where he had spotted some bones earlier, Royal gently fanned the silty bottom, and with cameras rolling, uncovered a perfectly preserved human skull with brain matter intact.

The scientific community was incredulous — and unconvinced. It just wasn't possible that a diver not trained as an archaeologist could jump into the spring and casually, within a few minutes, uncover part of a 10,000-year-old skeleton. The scientists were not even prepared to admit that man had living in Florida 10,000 years ago; and furthermore the skull was of a type previously known in only the very oldest deposits in North America. Obviously Bill Royal was either a



fraud or he had uncovered one of the most fantastic repositories of fossils on the continent. The scientists chose to believe that Warm Mineral Springs was a hoax, and after it was investigated by several prominent archaeologists who reported that the deposits were nothing out of the ordinary, interest in the Springs as an archaeological site waned.

Bill Royal continued to dive the spring, and continued trying to attract scientific interest. Without his perseverance and the efforts of the Daley family, owners of the spring, and George Wheeler, the spring's manager, the deposits in Warm Mineral Springs could very easily have been destroyed in the two decades since they were first discovered.

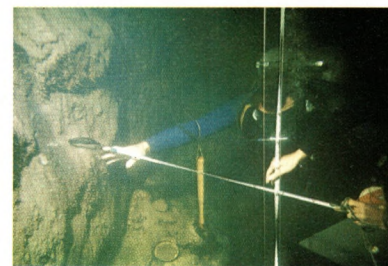
It was against this background of disbelief, rumored hoaxes and disinterest that Sonny Cockrell dove Warm Mineral Springs in 1972. Cockrell immediately recognized the potential of what he saw: A vertical profile of Florida's geologic history, extending back thousands of years. More importantly the water of the Springs, which contains no dissolved oxygen below the ten foot level and is very highly mineralized, had maintained this data in a remarkable state of preservation. Cockrell immediately began securing funds to properly excavate, and thus fully validate the site. Special grants from the Florida Legislature and the Sarasota County Commission, secured largely by Commissioner John Saba and Representative Bob Johnson, both active divers, and later on help from Senator Warren Henderson and Florida Secretaries of State Dick Stone and Bruce Smathers gave Cockrell enough funds to begin test excavations.

The state's investment paid off.  
*continued page 134*



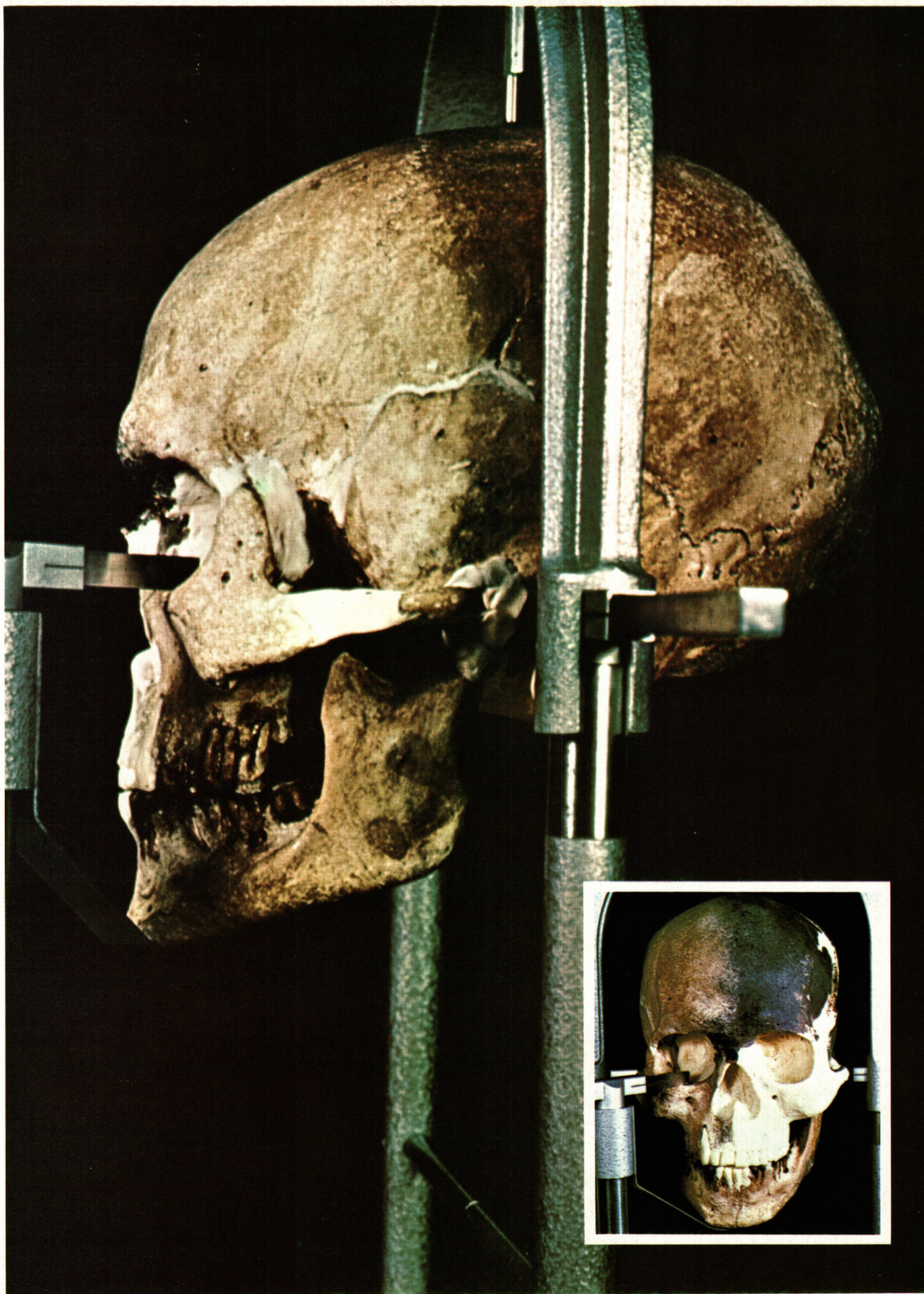
Steve Blount

(Facing page) This 10,000 year old skull belonging to a Paleo-Indian was excavated by Sonny Cockrell (above), Underwater Archaeologist for the State of Florida. Cockrell and Dive Officer/cameraman Larry Murphy work carefully at the burial site that yielded the skull and a skeleton (top left). Using a paint brush and a siphon, Cockrell meticulously removes silt from around the bones (top right). Artifacts were removed only after the spring was thoroughly mapped by volunteer sport divers using bubble tubes, tape measures and transit levels. Col. William Royal (bottom) discovered the Warm Mineral Springs deposits in the mid 1950's, and then spent almost two decades trying to convince the scientific community of the potential value of the fossils.



Richard H. Stewart







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## WORKING DIVER

continued from page 80

for several years now, yet you may find some trade schools who still use this plug in their ads. Be sure you are not misled by long lists of accreditations.

Most diving schools are approved for the following: VA, state grants and loans, Social Security Survivor benefits, Vocational Rehabilitation programs, unemployment benefits (some states have special laws that allow students who qualify to collect unemployment benefits while attending school), Federal bank loans, and of course are approved by the Department of Immigration and Naturalization Service so they are able to help the foreign student obtain a student visa. These schools are also approved for handling Canadian student loans and other foreign student financial aid and services. Please take note that some of these programs require at least six months of consecutive training in a course, and you should make sure of such time limits before you rely on a financial aid plan to help you pay your expenses.

Lastly, take heed of the following. John Ruskin wrote it way back in 1860, and it's even more meaningful today than it was then: "There is hardly anything in the world that some man cannot make a little worse and sell a little cheaper, and the people who consider the price only are this man's lawful prey." All diving courses are expensive, and the only thing worse than a bad deal is finding out too late that you cannot afford to rectify your error in judgement.

Your decision on which school to attend may be a toughie for you, especially if you live close to one that claims to give you a "cheaper" course, yet you feel the one across the nation, that will cost you a little more, plus the transportation to get there, is better. That's good. It will get your brain in gear. Then there's the decision of taking a two year course that includes a degree (if you can meet the stringent prerequisites), a fourteen week air/mixed gas course, or a 6-month course that includes air/mixed gas and bell/saturation training period. The latter will get you there "fastest with the mostest" in education, thus a greater initial salary.

So get busy on it. Now that you know you're qualified, and if you're willing to put up with the hardships, start figuring your finances. Read all brochures and catalogs, and go talk to the contractors if you can. Then make your choice and come on in. The water's fine. It may be dirty, but hidden beneath all that muck is your bundle.

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Includes round trip air fare from Kingston, Jamaica, two nights deluxe accommodations at the Havana Riviera and three nights at the Hotel Colony in the Isle of Pines. Three meals per day, three days of diving. Round trip air transportation between Havana and the Isle of Pines, all transfers, portage (no tips accepted in Cuba). Fully escorted by a knowledgeable Global Travel representative and an English-speaking Cubatur guide.

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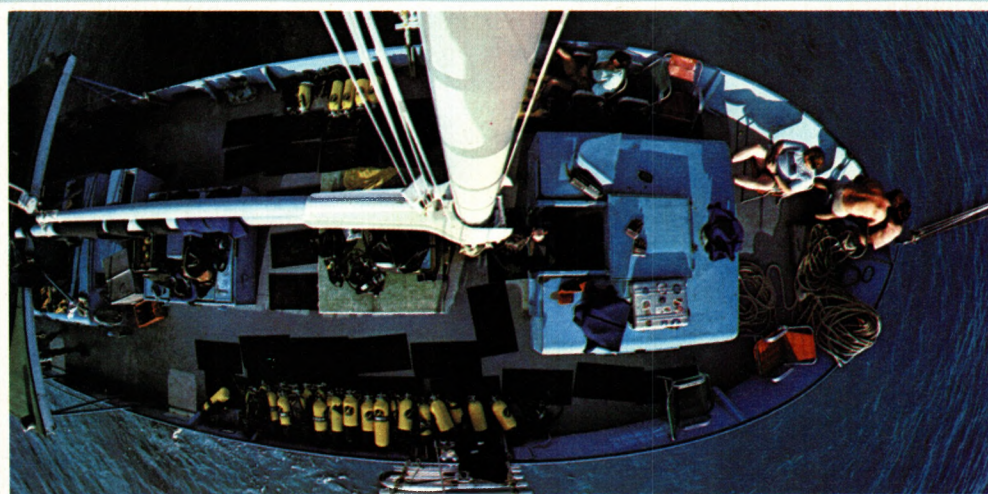
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# CUBA



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## REDISCOVER THE CARIBÉ

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STORY BY STEVE BLOUNT  
PHOTOGRAPHY BY RICHARD STEWART



Ninety miles out of Key West, due south across the Straits of Florida we waited nervously, international politics being what they are, for Havana Air Traffic Control to acknowledge our presence and friendly intentions.

"Havana Tower, this is 41 Romeo Victor, how do you read?"

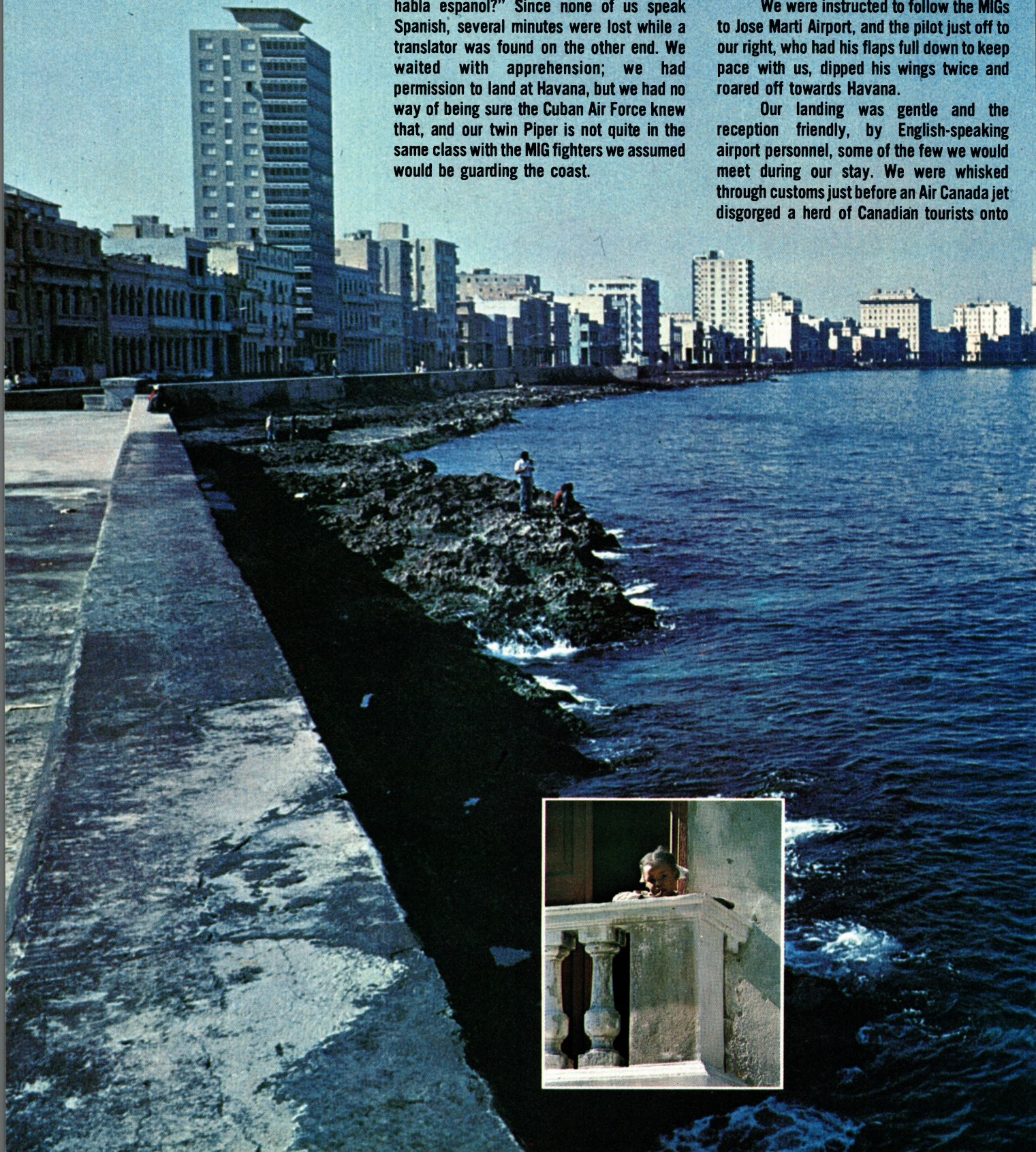
Finally the radio crackled back "41 Romeo Victor, this is Habana Tower, ¿que habla español?" Since none of us speak Spanish, several minutes were lost while a translator was found on the other end. We waited with apprehension; we had permission to land at Havana, but we had no way of being sure the Cuban Air Force knew that, and our twin Piper is not quite in the same class with the MIG fighters we assumed would be guarding the coast.

As the dense clouds rolled back, the coastline of Cuba appeared directly below. Just as suddenly, two Russian-built MIG-21 fighters appeared several miles behind us, rushing by almost within touching distance in seconds. As they came back around, Havana Radio came on to ask if we had noticed any other aircraft near us.

"Well, there's two MIGs about 40 feet off my wings right now."

We were instructed to follow the MIGs to Jose Marti Airport, and the pilot just off to our right, who had his flaps full down to keep pace with us, dipped his wings twice and roared off towards Havana.

Our landing was gentle and the reception friendly, by English-speaking airport personnel, some of the few we would meet during our stay. We were whisked through customs just before an Air Canada jet disgorged a herd of Canadian tourists onto





the tarmac and into the terminal. The baggage inspection was fairly casual, though we were asked to list all of the electrical gadgets (i.e. strobes and hairdryers) we brought with us.

On the other side of the small pink terminal, a bus waited; and baggage loaded, we have our first view of Havana as we motor towards the hotel and our inevitable appointment with Lunch.

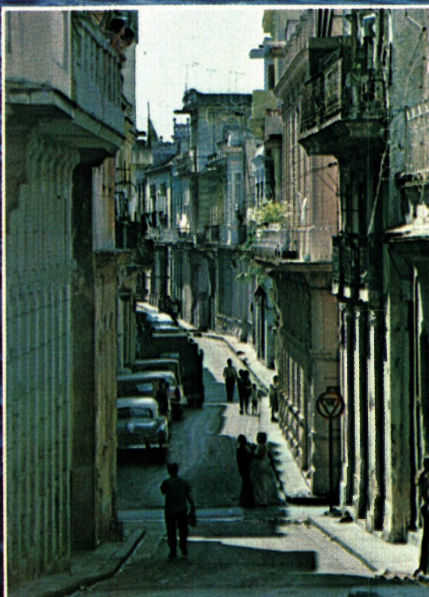
If there is anything sacred to the Cubaturs guides that escort all tourists in Cuba, it is Breakfast, Lunch and Dinner. The weather may be uncooperative, that's annoying; you may miss your Cubana Air connection, merely an inconvenience; but God forbid anything should interfere with the regular and timely consumption of Breakfast, Lunch or Dinner. This almost reverential devotion to meal time is so overwhelming as to make even the small eater behave gluttonously, or risk feeling anti-social.

This Lunch is not at all different from any of the meals we will eat this week, served semi-formally in the dining room of the very formal Havana Riviera Hotel. For a welcome meal, someone has planned grilled snapper, a delicious portion of baked fish. But the main course takes time. First there are repeated helpings of of pan y montechia, tasty selections of Cuban bread and butter, washed down with countless glasses of watermelon juice. This is followed by a fruit plate, this by soup, that by tomato salad, and each course is followed by lengthy intervals punctuated by conversation and coffee. Slowly, the true spirit of the island begins to sink in. It is the *manaña* spirit that urban Americans find so hard to understand. In Cuba, there is always time. Time for hour-long Breakfasts, hour-and-a-half Lunches, and two-hour-plus Dinners.

After Lunch cigars are offered all around and accepted, even by the non-

smokers. I light mine eagerly while the rest of the party vacillates between digestive silence and questioning Tony, our Cubaturs guide, about the rest of our itinerary. Larry finishes the last of the first of many ice-cream-and-cake meal-time denouements, Phil is in expresso heaven, consuming the last of the first of many pots of coffee. Richard has been calmed almost to silence by the overdose of Lunch, while Kathy moans something about a promise to eat less tomorrow (a promise repeated and broken many times this week). Alex, our Global Travel rep who made the Cuba connection for us, smiles. He was born in Matanzas, a few miles from here and is quite at home. Tony seems pleased that Lunch has been successfully consummated.

Although it is now late afternoon, Phil, Richard, Kathy, Alex and I unpack cameras for a stroll along the Malecon, the wide boulevard that fronts Havana Harbor. Along



The Malecon, a broad six-lane boulevard that runs beside Havana Harbor is not particularly congested during the day, but at night it is a maelstrom of vintage autos, carrying their passengers to the night clubs that line the avenue. Cars like this classic blue DeSoto make up a large part of the auto fleet; most are in amazing condition. The huge graphic of Revolutionary leader Che Guevara looks out from the Ministry of the Interior, dominating Revolution Square in Havana.



this strip are many fine, famous hotels. They once featured casinos and catered to Americans, but today they serve mostly Eastern European tourists, Canadians and only occasionally an American business delegation. As I walk, I relax. We are free and in Cuba; walking beside Havana Harbor, taking photographs of whatever appeals at the moment. I had not expected that it would be any different, but considering what the American press has said about this country, five American citizens carrying cameras and roaming freely through Havana is certainly revealing. It is dusk, and evening is just beginning for the Cubans. They are all over the Malecon, driving their vintage Chevys, Fords and Hudsons, and they are gracious, even eager, to talk with the obviously American tourists. Although very few of the people we met in the street spoke English, they were outspoken and free with their conversation when addressed in Spanish. They apparently harbor no hostility towards America or Americans, they are like people who greet old friends after a long absence. Welcome back to Havana, companero. I think that today we have covered much more than the 90 miles that separates our countries.

In the morning, after Breakfast with Hugo Pelegri, National Director of Recreation, we board our bus and return to Jose Marti Airport to catch a Cubana Air turbo-prop for the trip to the Isle of Pines, but we are late, the plane has left without us. Back on the bus, we head for the colonial section of Havana. Passing through the suburbs, we note the evidence of new construction everywhere. Tony and the other Cubans we meet are very proud of the progress Cuba has made in meeting its own needs. More housing, more hospitals, more schools, more teachers; in short more of everything we take for granted, things that were lacking and are

still in short supply. This pride and self-interest is refreshing and almost unique in the Caribbean area; for many countries it is too easy to squeeze the excess dollars out of American tourists.

The architecture of Havana's buildings reflects a perfect blend of Spanish baroque, Mayan geometry and tropical functionality. While most of the older structures are distinctively Spanish, the newer ones are quite modern; but not in the sterile mold of Modern American Sanitary Architecture.

They taste of a Mezo-American Indian influence, with rough-finished concrete exteriors and repeated triangular patterns.

In the colonial section we are free to wander alone or in pairs, unescorted and unsupervised. There are many gracious old buildings, winding back streets and three-story row houses painted bright yellow, pink, or green. Parked along the narrow alley-like thoroughfares are the usual vintage American automobiles. Pausing to photograph a blue DeSoto, I notice that the



Tourists are chauffeured around the coaches like this Pegasso (above), which is very comfortable with large windows and a full bar. From the airport at Nueva Gorona, we were bused to El Colony Hotel (right). The deep salt water pool is as close as some of the guests ever get to the ocean, the Eastern Europeans in particular seemed to prefer the sundeck to the beach, which is just 20 yards away.



In the middle hold of the Rio Jibacoa (above), Steve and Kathy explore the shattered ribs of the freighter. Towed into shallow water and used for target practice, the Rio Jibacoa (center, right) does not contain the many visible bombs seen around the Satour. Larry cautiously approaches one of the dud explosives (right) before checking out the vessel's prop (far right).



odometer shows 32,463.6 miles; judging the car's condition this could be the correct mileage. Like most of the other 30 to 40 year old autos we have seen, the DeSoto is in immaculate condition. Rounding the corner, I find a street lined with such cars in various stages of disassembly. Under each lies a mechanic, tools laid out carefully in the gutter, hoods propped open with 2x4's. As parts aren't available for these cars in the U.S., later I asked Tony how they keep the cars running. "Oh we make parts," he replied.

"Like in a factory?"

"No, if something breaks, you go to a machine shop and make the part you need."

It sounds like a lot of trouble, but cars that we would consider ancient make up a large part of the transportation system. There are also buses, newer European and Russian cars, and a large fleet of free taxis. The taxis are late model Chevy Novas, apparently sold to Cuba by one of GM's foreign subsidiaries.

Later in the afternoon we climb aboard a Cubana Air turbo-prop for the 25 minute

flight to the Isle of Pines. Baggage weight limit for passengers on the Havana-Isle of Pines run is 42 pounds plus a carry-on, or 45 pounds. As usual, our group's luggage is grievously overweight.

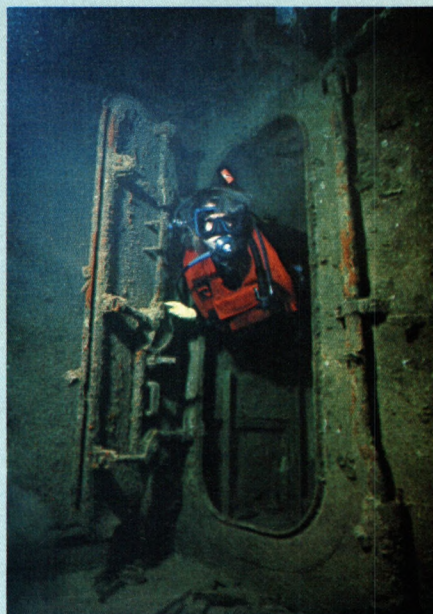
At the small airport in Nueva Gerona, our bus waited, a handsome Spanish Pegasso touring coach with full bar and restroom. Descending the steps, Luis Hernandez, director of diving operations on the Isle of Pines, and Noel Salazar, our new Cubatur guide help load our equipment onto the bus. The drive from Nueva Gerona Airport to El Colony Hotel is pleasant. We pass several of the secondary schools, soon to number 80, on the island. The Cuban government plans to concentrate all secondary level schools of the Isle of Pines, which is sometimes now called Isla Juventud (Isle of Youth) for this reason.

The island has another, more famous name, too. In the 16th, 17th, and 18th centuries, the many coves and inlets served as a refuge for Caribbean pirates, among them Edward Teach, the infamous Blackbeard. It is assumed that these men buried some of their booty on shore, and so the island became known as Treasure Island, after the Robert Louis Stevenson story of the same name.

After a quiet, lengthy Dinner at El Colony, we are asleep early in the cabana-style rooms. Built to house Cuban, Eastern European and Soviet tourists, El Colony is an attractive two-story concrete block structure. Each room faces the ocean, with a full glass wall towards the water and a patio or balcony. The rooms overlook a wide, green lawn and a strip of iridescent white beach bordered by coconut palms. The water here in Siguanea Bahia is only knee-deep out 100 yards, the bottom covered with sea urchins and sea stars; along its edge are sailboats and paddle boats for the use of El Colony's guests.

The 7 a.m. wake up call is expected, but still comes too early. Struggling into cut-offs and a tee shirt I head for the dining room and Breakfast. I have already resolved not to eat anything before the morning dive, but my place is set, fork and napkin at the ready, and a large ham and cheese sandwich rests on my plate. Giving in, I eat it; at least we'll be on the boat at noon, that should spare me the rigors of another Lunch.

We board the Pegasso for a short drive to dockside. The main diving vessel is the Acero 21, a 57-foot, steel-hulled ship that has a head, refrigerators, fresh water supply with deep sink, and is half-covered by a sunshade tarpaulin. Loading the gear, we are cheered to learn that all of our equipment can stay aboard each night.









The crew, our diving guides Alberto, Arcia, Crespo, Herrera and Pena, cast off and we head out of the channel into Sigüanea Bahía. We are headed for the wrecks, a two-hour ride, so we take the time to relax and lay our gear. Hugo and Luis require that each diver have a pressure gauge and a BC, the octopus is not mandatory. The tanks, bacpacs, weight belts, and weights are supplied. Because the new resort equipment is made by Spirotechnique, some U.S. first stages may not mate perfectly with the French J-valve orifices, causing a very slight

leak. A European-to-American tank valve adapter would be a good investment if you plan to make the trip, although Hugo has ordered a supply of these. Also, due to the weight belt configuration, you may need a double-ended C-clip to secure the bacpac crotch strap to your BC. The resort has 300 tanks, both singles and doubles, and the boat will carry as many as you'll need for a full day of diving.

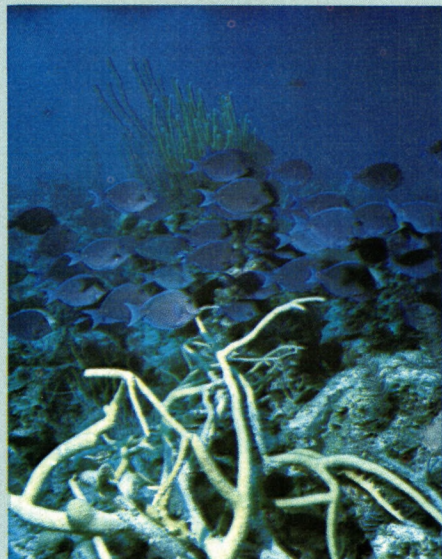
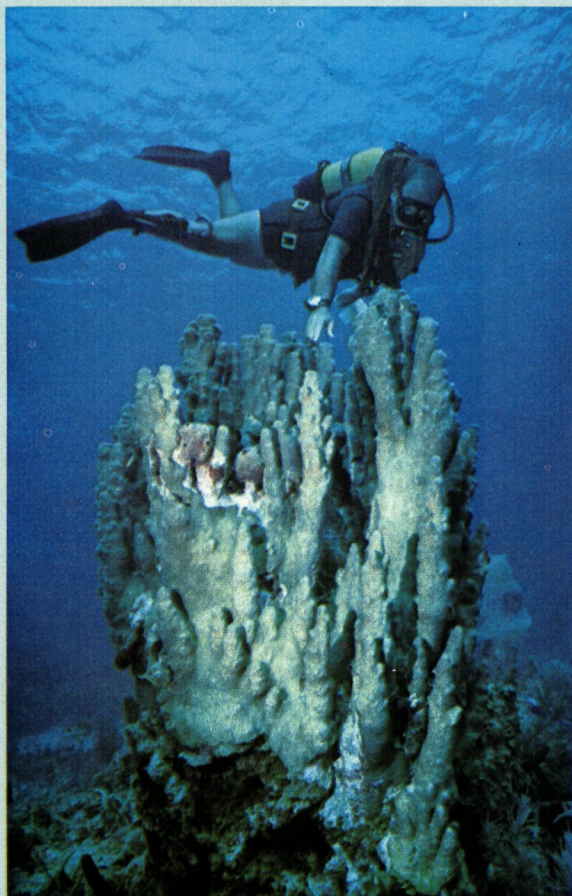
Arriving at the Satourt, we anchor 25 yards from the rusting superstructure that protrudes above the surface. Gear sorted and

cameras in hand, we go over the side into twenty feet of crystal clear water. The Satourt rests on a white sand bottom and all things considered, is in good condition. Originally a freighter, she was towed to this spot and used for target practice by the Cuban Air Force. Consequently there are some dud bombs still mixed in the wreckage or scattered around the hull, and these relics can be found under the collapsed deck plating in the forward hold as well. Jacks, grouper and yellowtails dominate the fish life here, schools of them move through the compartments and holds of the wreck, pausing only briefly to investigate our flashing strobes. Each recycle and the burst of light that follows paints them, dense silvery clouds against a dark aqua canvas.

The jacks outnumber the many species of tropicals, but they are all ruled by the most impressive wreck resident. Back aboard the Acero, Larry and Luis talk excitedly about "Lola," the huge barracuda that inhabits the stern section of the Satourt. Luis approximates the 'cuda's length as nine feet, a figure supported by the other guides and by Phil and Larry, who had quite a start when they were confronted by Lola in an interior passageway. A nine-foot barracuda is hard to believe but looking over the side of the boat, a very long silver shadow slowly circles the Acero; Lola has come for a handout. A quick jump in the water confirms Luis' estimate. Lola is by far the largest barracuda I've seen.

The anchor comes up and we move a few miles to the next wreck, the Rio Jibacoa. En route, Lunch is announced. Sure that I'll have a respite from the heavy meals served so far, I am dismayed to find that the Acero has a gas stove aboard, and that the menu is hot fried beef, deep-fried breadsticks, cheese, vegetables and fruit. Still, I'm pretty hungry and it all looks so good. Lunch is once again consummated, to the delight of Crespo, who stayed aboard during the first dive to cook for us. The refrigerators yield cold water, fruit juice and milk, and there's a pot of hot coffee that Phil has been eyeing jealously all morning.

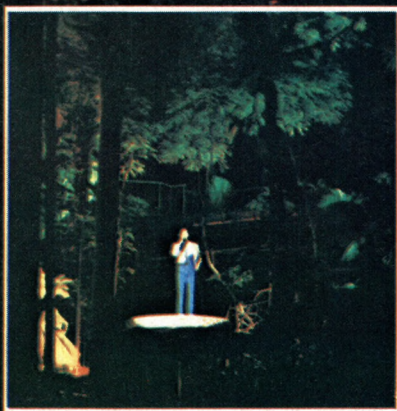
In the water at the Rio Jibacoa, the first thing we see is the huge prop; the blades must measure 18 feet from tip to tip. The fish are much the same as we found on the Satourt, but there are only six-foot barracudas here. There are many compartments to explore and a light is necessary as most are not open to the ambient light. There is also a dense algal growth that comes off and hangs in the water when brushed by fins, lowering visibility in the holds. Alongside the Rio Jibacoa is a smaller unidentified wreck, with good



Arco Iris Reef presents visitors with a rainbow of tropical growth: Pillar coral, staghorn coral, sea fans and gorgonians in 15 to 25 foot depths. Looking down into Blackbeard's Canyon reveals much of the same growth at greater depths. A vertical drop-off that starts at 80 feet, the Canyon reaches bottom at 450 feet.



# TROPICANA



exploratory potential. On its deck is a large parapet filled with ruined machinery. The twisted outlines of deck winches and schools of jack and grouper combine to present an ever-changing array of potential photographs. Back inside the huge middle hold of the Río Jibacoa, we swim among the towering ribs that lie smashed against the hull, or hang suspended from the deck above, cold steel stalactites in an iron cave. The eerie effervescent light in the hold gives an ethereal, almost cathedral atmosphere to the wreck.

As soon as we're back aboard the *Apero*, gear off, I find a cold Hatuey in my hand and a jovial crew; disjointed bits of conversation fly into the wind, so that I can

hardly sort the English from the Spanish phrases that constantly interrupt it. Hatuey is the national beer of Cuba, which is to say it is the only beer in Cuba: served ice cold, you can request it in any bar by mumbling "Una freo" (a cold one), and pushing a peso at the barman. It is delicious, light, and not particularly alcoholic, although after a full day's diving, it quickly finds its effect, and I am unaware of time passing on the return voyage.

Another 7 a.m. wake up catches me deeply involved in a favorite dream and 7 a.m. today is just as early as 7 a.m. was yesterday. I had hoped to adjust. This morning the Breakfast talk centers on our first dive: Blackbeard's Canyon, a vertical

drop-off that starts at 80 feet and plunges to the bottom at 450 feet. Very little is known about the Canyon and even Luis and Hugo have dived only a couple of locations along its massive face.

Washed in the freshwater sink yesterday and stored below decks, our gear is ready to step into, no unpacking, no bother. The freshly filled tanks are piled to either side of the *Apero*; it looks like we will carry 50 divers instead of 5. The *Apero* cranks faithfully and we skim out of Siguanea Bahía around Punta Frances towards the wall. It comes very clearly into view, a light green band extending from shore until, suddenly, the water is deep Prussian blue. We have

*continued on page 129*



# UNDERWATER PHOTOGRAPHY COMPETITION...

Entry Deadline March 31, 1979

1. Saltwater color.
2. Saltwater b&w.
3. Freshwater color.
4. Freshwater b&w.
5. Fixed-focus Photography-color.
6. Fixed-focus b&w (For Instamatic-type fixed-focus camera's only.)
7. Creative photography-special processing, infrared, solarization, etc.
8. Movies-fresh or saltwater.

Enter now! The second annual Sport Diver Magazine/Undersea Photographic Instructors Association international underwater photography competition is in progress now. Take this opportunity to display your talent in the art of underwater photography and you could win an exciting diving vacation. Finalists will be featured in Sport Diver's third quarter issue of 1979. Contestants may enter one or more of the following categories.

## COMPETITION RULES:

Contest is open to all amateur photographers.

All entries must be sent pre-paid with pre-addressed return envelope and sufficient return postage. All entries will be returned the week of, or before the final winning announcement.

Print size shall be a minimum of 3½x4½ inches, maximum of 8x10 inches, glossy finish and mounted on an 8x10 inch mount board. Entrants name, address and print title must appear on the back of each board.

Slides must be 2x2 inches mounted and inserted in plastic storage protectors with the entrant's name, address, and title.

Movies must be 8mm, super 8, or 16mm with or without sound, 15 minutes or less, with 75% or more exposed underwater and containing entrants name, address, and the film title marked on the container and film leader.

All possible care will be exercised, but no responsibility will be assumed by Sport Diver Magazine or UPIA for the loss or damage of entries.

Judging shall be done by the photo competition committee using a basic point system on technique, composition, color, quality and story. Decision of the committee will be final.

Winning photos will be announced in Sport Diver Magazine's third quarter issue of 1979. Submission of entry acknowledges right of Sport Diver Magazine to publish photographs entered.



Name \_\_\_\_\_ City \_\_\_\_\_  
 Address \_\_\_\_\_ Country \_\_\_\_\_ Zip \_\_\_\_\_  
 State \_\_\_\_\_  
 Full time profession: \_\_\_\_\_  
 Type of U/W camera most often used? \_\_\_\_\_  
 Please indicate amount of entries enclosed for each category.  
 Category 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ 8 \_\_\_\_\_  
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*Beautiful topside scenery and colorful invertebrates underwater make Puget Sound a favorite with West Coast divers. The Tacoma Narrows, which contains the wreckage of the first Tacoma Narrows Bridge that collapsed in 1940, is the sight of the Annual Tacoma Octopus Wrestle.*

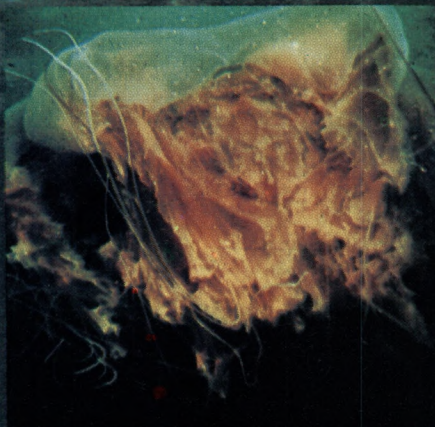




# PUGET Sound

*Story and photos by Claudette Dellon*

The most abundant and colorful marine life to be found outside the tropics has been attracting divers to Puget Sound in Washington state for many years. Perhaps you're already acquainted with the fabulous San Juan Islands or the Strait of Georgia, both located in the northern half of the Sound. Many of the same sights can be found in the



well-protected southern portion of this inland sea, from south of Seattle to Olympia.

In the southern Sound, you won't have to deal with pounding surf or heavy waves, both of which are considerations farther north. And since fog, high winds, and storms are virtually nonexistent, enjoyable shore



or boat dives can be made year round. In fact, many divers prefer the winter months, when reduced plankton growth and dormant kelp contribute to an average 50-foot visibility.

There are several excellent, uncrowded, and unspoiled dive sites between the narrow passages of Tacoma and the broad, quiet bays of Olympia. All are quickly and easily reached from Interstate 5, the major north-south artery, and present diverse diving conditions. Where rocky bottoms are the rule farther north, here you'll experience the full range of bottom conditions, from silt, to sand, to rock. The abundant marine life in these waters can be seen by even the casual diver who knows what to look for; the amazing variety is a result of the profusion of organic nutrients which thrive in the protected Sound.

One of the best known dive areas in southern Puget Sound, and one which is close to the site of the famous annual Tacoma Octopus Wrestle, is the Tacoma Narrows. The Narrows was the site of the collapse of "Gallopertie", the first Tacoma Narrows bridge on November 7, 1940. Gertie's twisted remains are still there to explore. She created an instant reef, attracting a virtual microcosm of North Pacific marine life.

In order to experience and enjoy this wealth of underwater life the diver must do two things. First, as with all dives in the Sound, you should check with local divers or dive shops for tide and current information. Many dives in the southern Puget Sound, particularly in the Narrows, are best undertaken at slack tide. Second, the water can be characterized by one word: Cold! Surface water temperature ranges from 54°F-64°F in the summer to 39°F-46°F in the winter. Below the thermocline, the temperature is a chilly 45°F year round, and a suitable cold-water exposure suit is mandatory. A snug-fitting 1/4" wet suit is a minimum, and many local divers have gone to 3/8" for added comfort; not surprisingly, dry suits are becoming more popular. A hood, gloves, and boots are also needed. Rentals are readily available and reasonably priced at various local dive shops.

Once informed of the tides and properly suited up, you're ready to plunge in. The challenging Tacoma Narrows site poses an element of

*The variety of life in Puget Sound is astounding. The cold waters are home to a number of Pacific species such as the lavender sculpin (top). Striped kelpfish (middle) are common all along the West Coast, but their coloration varies greatly, matching closely the coloration of the local kelp. Canary rockfish (bottom) can be seen close to the bottom almost anywhere in the Sound.*



danger, even to the experienced diver. The bottleneck configuration causes current velocities that can reach 5 to 8½ knots. However, these currents can create 100-foot visibility, compared to 20-25 feet for the rest of the Sound.

The outstanding visibility will assist you in spotting the many octopi in rocky ledges, from shallow depths down to 160 feet. If you're lucky, you may even glimpse one of the giant, 30-foot wide octopi that Puget Sound is so famous for. But don't go poking in too many holes, wolf eel also live in the rocky ledges of the eastern wall.

On the bottom you'll see a myriad of filter feeders. This is a good place to snare scallops or pursue crabs, the most prized of which is the delectable Dungeness. Even the unglamorous mussel exists in quantities sufficient to justify commercial harvesting.

If you enjoy spearfishing, there are many large rockfish, red snapper, black sea bass, and Pacific ling cod. Presently more and more conservation-minded divers are restricting their hunting to "shooting" with a camera. If you plan to do any hunting or shellfish gathering, be sure to check current Washington State regulations for season, size, and bag limits.

Just south of the Narrows Bridge is Titlow Beach, a natural back eddy offering a taste of Narrows diving without the hazardous current. Chief attractions at Titlow are an abandoned landing slip and the extensive dock pilings of a large marina which burned some time ago. It's also a good place to hunt artifacts and bottles. Entering the water from the sandy beach, heavy eel grass and low growing kelp beds cover the bottom. At 30 feet you're into the old ferry slip area, a fairy tale hallway of white metridium, anemone-covered piers. Gaps in the piling afford access to an old barge. The area between the barge and the piling is a kaleidoscopic array of local fish of many varieties.

The piers at Titlow are a habitat for red Irish lords, sea perch, cabezons, bass, and ling cod. Big 16-ray hobicat stars amble along the bottom with other picturesque giant stars. You may encounter colorful sea slugs as well. Puget Sound varieties range from giant nudibranchs which resemble bonsai trees to small, brightly colored



nudibranchs reminiscent of tiny feather-boas. If you're looking for octopus, Titlow is the place! Take a light, you'll find many under shallow slit ledges as shallow as 25 to 45 feet. Incidentally, while you're absorbed in underwater pursuits, non-diving friends or family might enjoy fishing off the piers or visiting Titlow Park, maintained by the City of Tacoma.

Just below the Titlow Beach, on the southern limits of the Narrows, is Day Island. The "island" is actually a small peninsula which protrudes from the Tacoma coastline. Below 60 feet, the bottom drops off dramatically into a deep sub-marine canyon. The canyon wall, which extends south for 70 feet, is a vertical garden of anemones, sponges, and other encrusting animals. Extreme caution is required here; canyon currents are swift. At shallower depths, however, currents are relatively minor, and marine life is rich. Octopi and wolf eel abound. Beautiful pink tube worms, flounder, large, burrowing moon snails, painted greenlings, anemones, and countless orange sea pens on which the starfish and nudibranchs feed can be found along the bottom.

Some divers claim the most beautiful wild seascapes in Puget Sound can be found at the Fox Island Bridge, another Narrows dive site located two bridges west of Tacoma. The view is especially spectacular on the Fox Island side, where parking and boat launching are conveniently located. Close in to shore, nooks and crevices in the rocks provide shelter for Irish lords, rockfish, sunflower and rose stars, giant barnacles, hermit crabs, sea pens, and more. Farther out, bridge abutments and pillars reach down to a crowded piling concentration, around which enormous schools of sea perch swim.

Tolmie State Park, a wonderfully uncomplicated and generally current-free site, is located eight miles north of Olympia at the southernmost portion of the Sound. Tolmie affords a refreshing change of pace from Narrows diving. It's Washington's newest and most extensively developed state park for divers. Three sunken, wooden gravel barges provide all the necessary ingredients for three super dives. The smooth sand and silt bottom slopes gently to the barges, which are marked with



*Soft sea stars (top) and nudibranchs (middle) are some of the more colorful of Puget Sound's inhabitants. The several species of sea bass present (bottom) all make excellent meals, but should not be confused with the kelp rockfish, which, because it is sometimes found floating head up and sometimes floating head down, is commonly referred to as the "dumb bass".*

buoys for easy identification. The largest barge, with a picturesque, high wooden railing, is 110 feet long and rests in 40 to 50 feet of water. The other two are 90 feet long and are located at the 50 to 60 foot level. Barnacles, snails, and brilliantly colored sea slugs abound on the barges, as do rockfish, cabezon, perch, and ling cod. Also much in evidence are the sea anemones, with their lacy filter-feeding plumage open to capture microscopic food organisms. Good artifact hunting and shell collecting are possible here as well. Virtually everywhere in the surrounding sand lie clusters of half-buried geoduck (pronounced "gooey-duck") clams, truly the largest, most impressive hardshell clam in the Pacific Northwest. They average three pounds in weight, but some reach ten pounds. Sea pens, moon snails, flounder, and horse clams share the bottom with the giant geoducks, while orange burrowing sea cucumbers extend flower-like tentacles to complete an aquatic garden of breathtaking beauty. While you're enjoying the sights at Tolmie, non-divers might enjoy touring the nearby State Capitol complex or the Olympia Brewery in Tumwater.

Should you need overnight accommodations or desire a good meal, there are any number of fine hotels, campgrounds, and restaurants in both the Olympia and Tacoma areas.

One final suggestion: When you've completed your daytime dives, why not grab a light and do it all again at night! Night diving in the Sound offers a truly unique opportunity to see octopi and wolf eel out hunting in force. You might enjoy stalking tasty lobsters or big, ten-inch prawns, both of which are easily taken at night. Turn off your light at some point so you can take in the phosphorescence of the Sound at night. Even the smallest crabs look magical, and you'll swear the eyes of the ratfish glow like sapphires. Whether or not you opt for a night dive, you'll come away with the feeling that your daytime diving experiences in this uncrowded Northwest paradise were nothing less than spectacular. Who says you have to go the San Juans or the Strait of Georgia to see the sights? All the adventure you could possibly hope for is yours in southern Puget Sound.





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The all new approach is designed to be flexible and versatile and to make learning to dive simpler and more enjoyable, yet challenging. The program should reduce instructional costs, make more effective use of instructional time, redirect and improve the role of the instructor in training, more efficiently produce a capable diver who can meet standard performance requirements and emphasize the need for advanced training.

The new course focuses on what a student actually needs to know to dive safely, improving retention of this material by eliminating unnecessary detail. More information on the course can be obtained by writing: PADI, 2064 N. Bush Street, Santa Ana, California 92706.

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## SEA LIFE DANGER

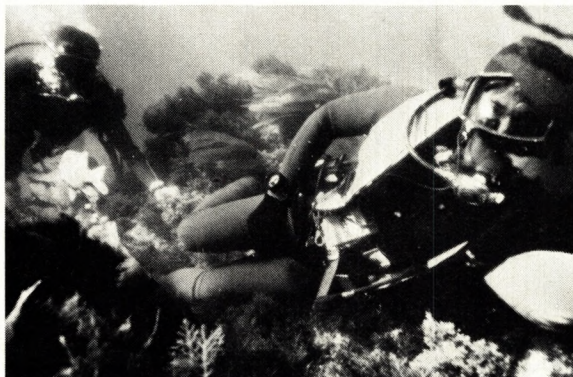
Environmentalists are becoming aware of a new danger to ocean creatures. Pollutants and trace substances such as DDT not only work as a poison but also apparently affect the chemical communications system that regulates sea life.

Minute amounts of these substances affect chemical messages that bring mates together, aid in the search for food, signal the approach of enemies and hold family groups together.

An example is the discovery that lobsters are attracted from afar by strips of paper saturated with petroleum. Fishermen in Nova Scotia used this trick to catch lobsters before the scientists ever learned about it.



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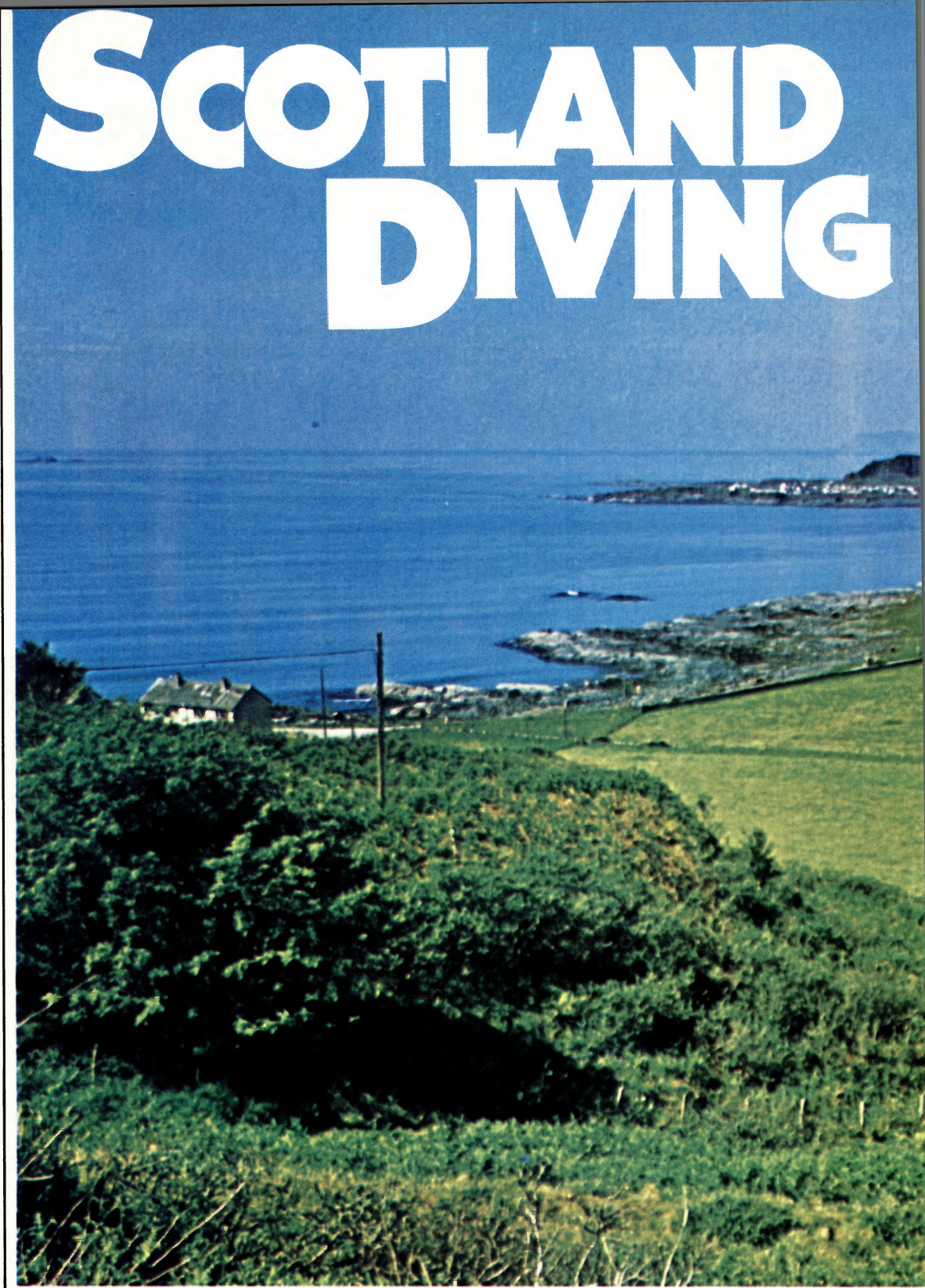
**Scuba Diver C.B.**





*Story by  
Walt Deas  
Photography  
by Walt and  
Jean Deas*

*When God  
finished making  
Britain, some  
fragments of  
earth and stone  
were left from his  
ample apron.  
With a smile he  
flicked them out,  
and they fell  
into the western  
sea to form  
Argyll  
and Bute.  
So runs an old  
Gaelic legend.*

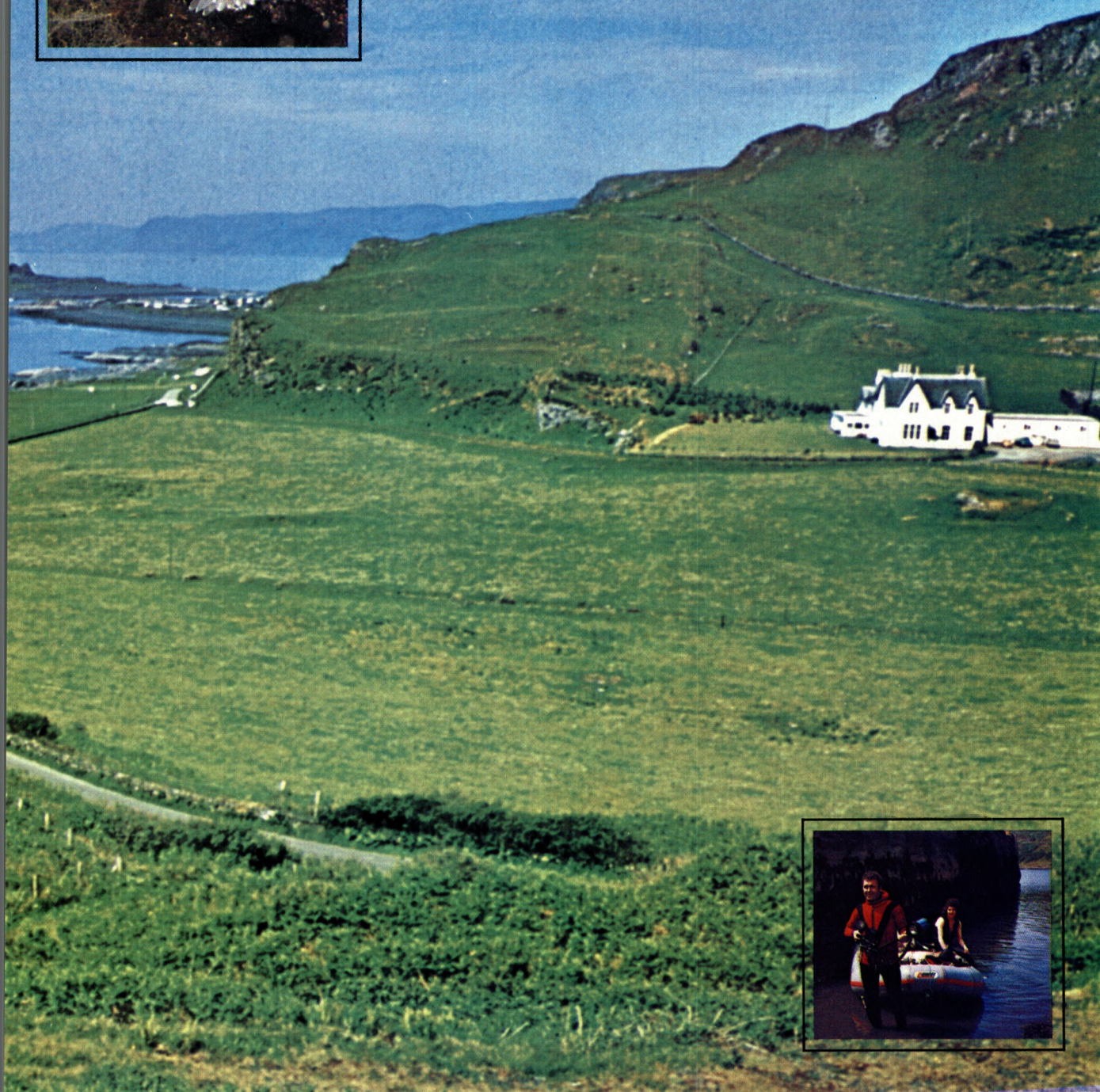


Arisaig, Gairloch, Kyle of Lochalsh, Aultbea, and Ullapool are names that don't come easily to the English tongue, but to divers familiar with their waters, they all mean some of the finest diving available in the British

Isles. It is in the western highlands that easygoing charm, beauty of location, and diversity of diving come to focus; and these come to focus most sharply at Oban. Roads from the north, south, and east lead to Oban; but it

is not the roads that determine Oban's place in the mainstream of Highland life, it is the sea. Everywhere you are aware of the sea; calm and dreamy on Loch Craignish, or thrashing and tempestuous as it is off the





Mull of McIntyre. The seaways spread out to the many islands: Mull and Lismore, Jura and Islay, Staffa and Iona, Coll and sunny Tiree, reaching as far as the Outer Hebrides. Ringed by wooded hills,

Oban has grown around a deep bay, and has become a mecca for water sports enthusiasts of all types.

I first dived at Oban, and neighboring Easdale, in 1953. At that time divers were a great curiosity, and crowds

would gather as the weird-looking "frogmen", as we were called, flip-flopped into the cold waters of the bay. Since that time, divers have become quite common, due to the unusually clear water, the abundance of scallops



The cool water of Oban Bay supports a variety of invertebrates and crustaceans. Norwegian lobsters and conger eels abound near the railway pier, and there are many old bottles to be found as well. From Oban there are many good diving areas in easy reach: Ardentrive Harbor, the Slate Islands, the Sound of Kerrera and others.

Wrecks are common along any of the rocky areas or reefs that border the sea, such as White Lady Reef. Some of these wrecks date to the middle or early 19th century, and the later ones are almost uniformly in good condition.



*Pecten maximus* and *Chalmys operculis*, and the efforts of David Tye of Oban Divers Limited.

David Tye first came to Oban many years ago. He loved the area and convinced his wife that a commercial diver could do well in an area so dominated by the sea. Leaving a secure life in England, David and his wife moved to Oban, and things were just beginning to work out for David's business when he was hit by a bad case of decompression sickness. The accident confined David to a wheel chair and ended his professional diving career,

Sport Diver

but determined to stay in Oban and share its underwater richness with others, he opened Oban Divers. Today, Oban Divers is a smooth, efficient dive center with rooms, a dive store, dining facilities, and has become the center of diving activities in the region. With the help of his wife, son and daughter, and two divers, David Tye is able to offer the visitor a rich and exciting dive experience.

That experience starts beside the railway pier in Oban Bay. There you'll find lobsters, conger eels, and many old bottles. Bottles may

also be found directly off the North Pier or under the yachts moored off the boathouse into the Sound of Kerrera. Whichever dive you take, be sure and check with the Harbourmaster before diving, as a boat may be due in. Farther out in the bay is an old wreck in about 40 feet of water. The *Golden Gift*, usually called the *Puffer*, is excellent for inexperienced divers or a night dive. Nearby Ardentrive Harbor has several interesting wrecks on a mud bottom and many Norwegian lobsters, which are excellent when cooked as scampi.





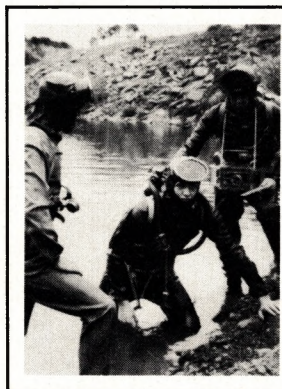
Leaving Oban on the Lochgilphead Road, more good diving is available just 15 miles to the south. Taking the proper turn at Kilninver, you cross the Clachan Bridge leading to the island of Seil. The village on Seil should be called Ellanbeich, but over the years, both it and the neighboring island of Easdale have been jointly called Easdale. Ellanbeich is now a peaceful holiday village, but a century ago it was one of the main centers of slate-quarrying. From 1842 to 1862 over 500,000 pounds sterling worth of slates were cut out of the ground, and by 1881,

the quarries were being worked to a depth of 250 feet. Early one Tuesday morning in November, 1881, a fierce gale pounded Easdale and Seil. The sea smashed the retaining walls and tons of water poured into the quarries; in minutes the prosperity of the slate islands had been shattered. Today the wharves, quays, and neat rows of whitewashed cottages convey a sense of old-world beauty and quaintness to the visiting diver. In the main quarry on Seil, the water is unaffected by the weather, and although likely to be chilly, the

visibility can exceed 100 feet. Just west of Ellanbeich there is a good dive down a cliff face, but unless you have a boat, access is difficult over the kelp and rocks. In Scotland, when you take up diving you usually take up mountaineering at the same time, as it always seems the best dive sites are at the bottom of a cliff.

A good dive with easier access is in Ardmucknish Bay, north of Oban. In 90 feet of water rests the wreck of the *S. S. Breda*, a wartime transport sunk by bombs in 1941. Many parts of the ship remain intact, but don't go





looking for the prop, as David Tye recovered it years ago. Nearby Dunstaffnage and Eilean More offer interesting dives and a variety of marine life, including scallops, prawn, and lobster.

South of Lismore is Lady's Rock, where the many rocks and reefs beneath the surface have threatened sailors for centuries. At least one unlucky vessel, an old MacBraynes steamer is scattered around the outcropping. A wall of kelp grows down the side of the Rock, and within this mass of weed are soft corals, Dead-Men's-Fingers (*Alcyonium digitatum*), and the odd solitary coral, Devonshire cup coral (*Caryophyllia smithi*). The cold water here fairly bristles with beautiful nudibranchs and a multitude of encrusting marine life.

Although not offering wrecks, other fine dives would have to include Ard Na Cuile and the lower end of the Sound of Kerrera. At Ard Na Cuile there are several steep cliffs with quite deep dives at their base, and the nearby White Lady reefs offer clear water, lush kelp growth, and lobsters. The Sound of Kerrera has two underwater peaks which apparently are mostly unexplored. In each of these areas, as at Lady's Rock, the current can become quite treacherous as the tide changes, so local information and tide charts are a must before a dive can be undertaken.

Normally it's a lack of air that forces me to surface, but when diving in Scotland, I often found it was the cold water that caused me to terminate my dives. Even in

a quarter inch (seven millimeter) wetsuit, I found my hands so frozen they could not operate the camera controls. Once I had stood in the sun on the surface, though, I soon contemplated another dive. Yes, the sun does shine in Scotland; in fact, it is usually quite warm on the surface. Scotland is not all castles and foggy moors, although both of these exist; it is a mixture of modern convenience, ancient hospitality, and bountiful marine life. Together they add up to a vacationer's paradise.



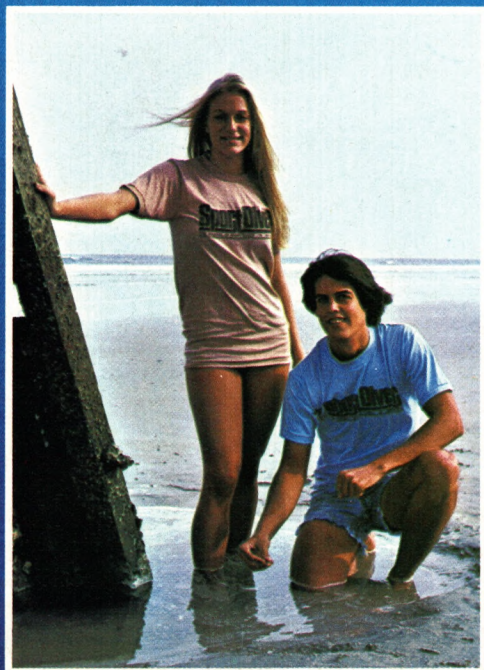

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For help in planning your vacation or information concerning rates, package tours, et cetera, see the listing on page 114.



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## THE SUBJECT IS WHALES

*continued from page 86*

sounds in their head and pass them through this fatty tissue for focusing into the desired frequency for short or lengthy travel. The sounds bounce off objects in their periphery and are received by the lower jaw where they travel to the inner ear for deciphering. This system is so precise that animals can find and strike at food in total darkness.

Earlier we mentioned a physical characteristic of cetaceans which is labeled with some pretty fancy words, "laminar flow". The skin of cetaceans is very similar to a sponge, where water is actually absorbed. Water moving through water creates little friction, and this is why these animals are able to move so rapidly through the water and how they can maintain these rapid speeds for hours at a time.

Interestingly enough, a lot of thought is being given as to why cetaceans are so diverse in coloration. Some dolphins of the South American waters are incredibly patterned with reds, blues, and whites. Other animals such as the bottlenosed dolphin are basic dolphin gray. Some of these animals have to be observed to be truly appreciated, for an artist of incredible imagination would have a difficult time matching some of the patterns.

Blue whales were labeled this way because many of the herds were comprised of animals which were one or another shade of blue. Yet, recent observations of blue whales in the Sea of Cortez (Gulf of California) show many to be almost chrome-like in coloration. True's porpoise is identical to Dall's porpoise except for a slightly extended white coloration on the flanks. While most researchers do not recognize True's porpoise as a separate species, there is still talk that these animals may someday require a distinct categorization by race. At least three sub-species of bottlenosed dolphins are recognized throughout the taxonomical world, and yet the differences are mostly in the shade of gray coloration. Common dolphins also have this color variation in herds of different geographical regions.

Adding to this confusion is the lack of a true definition of a whale, that is, one agreed upon by all. Killer whales, pilot whales, and false killer whales are not true whales at all but rather the largest of the dolphins. The study of the bottlenosed and beaked whales is a science unto itself.

Some have characteristics of whales and characteristics of dolphins too. How should they be categorized? While it seems impossible to label these animals within a definite family or genus, it does appear that the taxonomical structure of all cetaceans is in great need of re-evaluation and redefining for today; it is a jig-saw puzzle with thousands of hours of whale watching and researching needed to put the pieces together.

Cetaceans are an extraordinary order of mammal. The concern and deep commitment for their preservation and protection is prolific and generating more and more interest and supporters every day. It is to this end which the preservationists must struggle, for the whale is far more than a taxonomical order. It is a symbol of freedom and joy, a symbol which we cannot and must not deprive our descendants of seeing, experiencing and appreciating.

*continued from page 112*

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Laggan, Glenshellach Road  
Oban, Argyll. Tel: Oban  
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23 Ravelston Terrace  
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Hawaiian Divers  
Box 572  
Kailua-Kona, Hawaii 96740





By P. Z. Trupp



# WASHINGTON CURRENTS

## Shipwreck Protections Posed

Shipwrecks on the continental shelf will for the first time be under strict federal control if an amendment to the U.S. antiquity laws is okayed by Congress.

The amendment comes from the U.S. Interior Department, which wants an immediate end to private plundering of historic undersea artifacts.

"We're losing historical and scientific data on a daily basis," says Charles McKinney, Manager of Interior's Federal Antiquities Program. He believes the government must address the issue of wrecks now — before it's too late.

Once the loss of these cultural resources is halted Interior hopes to move ahead on what McKinney calls a "resource base inventory survey" to describe the kinds of wrecks, their numbers and potential archeological value. The survey will lean heavily on cooperation by professional salvors, archeologists and sport divers. Private salvors would be used as federal contractors to provide logistical support. If approved, the survey will be funded by Interior and the Commerce Department. Exact cost is unknown. But Mr. McKinney estimates that "several million" dollars will be spent over the next few years. He admits he's proposing a monumental task and that it will take years to complete.

The proposal to place shipwrecks under federal jurisdiction has run into stiff opposition. Some salvors complain they're being edged out of a livelihood. Professional archeologists take another view and claim the government is sponsoring a give-away to private interests.

One group, the National Explorers & Collectors Association, says the McKinney proposal smacks of "big brother". The NE&CA charges Mr. McKinney is leading federal "archeocrats" in a tax-supported drive to confiscate all treasure wrecks in and around the U.S. and severely alter the right to collect antiquities.

But these antiquities belong to all citizens, insists Mr. McKinney, and their right must be protected.

"The criticism comes from both ends," says Mr. McKinney. "We're

fighting the salvors and the academic people. But we're undertaking a valuable piece of research. It's a significant contribution to American heritage."

Mr. McKinney hopes for quick Congressional action. If it is forthcoming, the government will begin its search of the bottom before the end of summer.

## Oceans Policy Overdue

Waiting for Washington to come up with a wet NASA?

Don't hold your breath. The Carter Administration, which promised a national oceans policy more than a year ago, is still fumbling its attempts to come up with a workable plan.

What's missing (among other things) is a clear-cut goal. No goal — no programs.

This year was to be one of decision-making with the Comprehensive Ocean Policy Study, directed by Dr. James Curlin, to be completed this spring. It sounded promising. But realistic action is still a long way off.

Even if a policy were announced today it would take a year or more to receive funding and even longer to start up hardware programs. And the longer we wait the more it's going to cost the taxpayer.

The Administration must act quickly. The talent and imagination are available at NOAA and other federal agencies; those in the White House would do well to use it.

## UMS Hotline

The Undersea Medical Society here is working on a national network of treatment centers for injured sport and commercial divers. The idea has federal backing, with funds coming from the Energy Research and Development Administration. The plan is for the UMS to establish a toll-free number for instant advice on accidents and injuries. *Sport Diver* will publish the hot line number when it's available.

## A Little Safer

There were 147 non-professional scuba accidents in 1976. How does this compare to previous years?

According to John McAniff, who recently sent his accident report from the University of Rhode Island to Washington, D.C., "We're holding the

line, if not getting a little safer."

Each year scuba fatalities increase by 5 to 6 percent, but each year there are about 15 percent more divers.

The worst previous year was 1974 when there were 144 deaths nationwide. In 1975, 131 fatalities were reported.

In the latest figures the "proximate starting cause" of accidents were: medical and injury cases, 49, of which 10 were air embolisms. Eight deaths were due to heart failure or heart attack. Probable exhaustion, embolism and panic accounted for 24 fatalities, and about half of this group are in the "suspected air embolism" category.

Florida led the nation with 40 scuba fatalities, followed by California with 24 and Hawaii with 11. Washington State reported 9 deaths.

Environmental causes claimed 52 lives. Among this group 21 were lost or out of air in caves. Out of air at depth accounted for 7 deaths and a similar number of accidents were attributed to strong currents. Heavy surf took 3 lives; kelp entanglement claimed 6, and 3 divers were lost under ice. Hawaii reported one suspected shark attack.

Other causes include entanglement in ropes and nets (3 deaths) and one diver was lost on a night dive. Equipment-related accidents claimed 7 divers.

One death was caused by overweighting — 32 pounds of lead worn under the BC. Another diver died because equipment was tied to his body and couldn't be released in an emergency.

There was a freak accident when a scuba tank fell out of its backpack and the victim was strangled by a neckstrap. In another equipment case a backpack BC inflated at the wrong time and pushed the victim against a cliff wall.

Thirty-four deaths were listed as "cause undetermined".

"The figures speak for themselves," says Mr. McAniff. "We see a lot of human error. And obviously we need more 'human engineering' on dive gear."

He says too many divers are overburdened with extra hoses and

*continued on next page*





other potential entanglers. Some equipment is incompatible with other gear. Diving equipment, says Mr. McAniff, should be redesigned to make it easier to use. Some of it is getting dangerously complex.

Maybe it's time for manufacturer's to reassess their super-systems and get back to simplicity.

#### **Looe Key Sanctuary**

Looe Key, one of the largest coral outcroppings in North America, will be designated as a marine sanctuary late this year.

Located six miles off Big Pine Key, Florida, Looe will be barred by the federal government to commercial fishermen and coral hunters. But divers and sport fishermen will be allowed to take limited game, according to NOAA Ocean Management officials.

NOAA has been meeting with public and private groups on Big Pine and is writing an analysis paper focusing on Looe, which covers about 20 miles of off-shore territory. So far, the Florida Reef Foundation has spent about \$6,000 in federal grant money to study the reef's ecological importance.

Looe has had its share of bad luck. Not long ago the "Reefer Wreck" — a small boat carrying a cargo of marijuana — went aground on the reef. The boat couldn't be towed into deep water and had to be dynamited, which didn't improve the reef's endangered status. In time, sanctuary status should help repair the damage.

NOAA also has received a sanctuary nomination from Texas, which is seeking to protect the Texas Flower Gardens Reef in the Gulf of Mexico.

Under consideration for sanctuary status are 170 other nominations. NOAA officials said those in Alaska and California will receive high priority.

#### **Gold, Uncle Sam and the Godfather**

Federal agents have the latest underwater intrigue: \$2 to \$6 million in sunken gold — and maybe the Godfather. The gold is said to be cargo on a sunken mail boat, the *Central America*, lost in the 1800's near the Diamond Shoals of Cape Hatteras, North Carolina.

Government agents said the gold was being sought by a treasure hunting organization out of Jacksonville, Florida, with the help of Mike Daniels, whose family owns a fishing fleet in Wanchese County, North Carolina.

They said soon after Daniels and the Florida group went to work they were approached by strangers who threatened lives and promised to jump the claim. Strange boats and aircraft regularly buzzed the dive site.

Art LePage, owner of the nearby Outer Banks Dive Shop, said it was widely speculated that the men were syndicate professionals. The threats continued and the search had to be called off.

Daniels told *Sport Diver* the expedition had cost him nearly \$20,000.

Federal agents aren't very talkative about the details. But they said any activity involving the *Central America* is being closely monitored. Government interests rests in proper salvage claims and the Coast Guard is cruising the site.

But Daniels said he's already for another try. He and the Florida group will go after the *Central America* this spring. Daniels says he's applied for salvage permits allowing a 40 percent return. If the gold is uncovered it will mark one of the biggest finds in recent years.

#### **Garbage Out: Atoms In**

Dumping of harmful wastes in the ocean will end by 1981, says Environmental Protection Agency Administrator Douglas M. Costle.

Mr. Costle claims EPA has cut dumping of wastes by 90 percent in the past half decade, thanks to licensing procedures under the Marine Protection, Research and Sanctuaries Act. An amendment to that law makes dumping of municipal sewage illegal by 1981.

That's fine. But when will Washington tire of dreaming up ways to bury radioactivity in the sea? The latest brain storm has it that nuclear wastes will fit neatly into fracture zones along the mid-Atlantic Ridge. At depths to 20,000 feet scientists believe they'll find relatively still water and plenty of covering sediment.

Earthquakes along the fracture zones are theorized to be non-existent. And even if those lead containers do get shaken up the sea's ferro-manganese oxides are supposed to restrict the escape of plutonium.

How safe can you get?

EPA says no more sewage. But the boys with the bombs will replace it with something far worse. We'd like to see the government do backup studies to project the consequences of an atomic leak — just to be on the safe side, that is.

#### **Cousteau Warns Washington**

Jacques-Yves Cousteau, the 67-year-old undersea pioneer, recently told official Washington that we're causing irreversible damage to the oceans.

On tour to plug the Atlantic Richfield-sponsored TV series on the

wreck *Brittanic*, Cousteau said irreparable damage has already been caused by pollution. But the damage comes mostly in small steps.

"You can deteriorate the oceans partially, but forever," Cousteau told reporters here. "Already now there are species that have disappeared and that will never come back. That's irreparable damage."

The argument that evolution will repair the seas isn't valid, Cousteau said. Evolution is a slow process. Damage to the sea happens quickly, sometimes overnight. Deterioration and the evolutionary process don't match on the scale of time.

"We must stop deteriorating the oceans because it becomes irreversible and we are giving to future generations a damaged world," he said.

#### **NAUI Appointments**

Ken Heist, Washington-based diver and underwater photographer, has become NAUI's new Mid-Atlantic Branch Manager, taking over from retiring Lee Knalves. Heist is a member of the Atlantis Rangers, the east coast's largest and most active wreck diving organization.

Jay Wensel, sport diving's legal man in Washington, has received a one-year appointment to NAUI's board of directors. Wensel fought OSHA and kept federal regulation out of sport diving. Wensel said he'd keep up the fight against federal encroachment, "leaving us free and clear to go our own way." He fills the spot resigned by Dr. Lee Somer of the University of Michigan.

Elected to four year board terms were Barry Allen of Massachusetts and IQ-9 Director Lou Fead. A one year term went to Debbie Brennan, who is widely known for her hyperbaric chamber research.

#### **OCEANLAB Gets Moving**

A \$1.2 million contract for defining the physical characteristics of the planned OCEANLAB mobile underwater laboratory has been awarded to the Re-entry and Environmental Systems Division of General Electric Co., by NOAA.

The 11 month contract will provide preliminary specifications for the OCEANLAB System as well as program plans for subsequent phases.

GE has formed an OCEANLAB team with Perry Oceanographics, Inc., of Riviera Beach, Florida, and M. Rosenblatt and Son, Inc., of Arlington, Virginia. GE and Perry conducted a preliminary study of the system last December.

OCEANLAB will provide the U.S. with a capability for advanced underwater research during the 1980's. Its mission capabilities will help scientists and engineers develop and use offshore oil, gas, mineral and



fisheries resources. The system will be equipped with complete laboratory facilities, providing complete on-the-spot research capabilities.

#### Resolving Ocean Conflicts

The single most important issue facing us on a national level is resolving conflicting uses of the oceans, says Senator Ernest F. Hollings (D-S.C.), Chairman of the National Ocean Policy Study.

There are growing numbers of conflicting uses, such as oil and mineral production, fishing and the effects of development on the water quality of estuaries. This makes it all the more crucial that Congress and the White House work together to confront the problem, according to Senator Hollings.

The Administration is now reviewing ways to reorganize the natural resource and environmental functions of the federal government. This effort, says Senator Hollings, "is terribly important."

He warns that unless ocean functions are properly consolidated we will defeat efforts started more than 10 years ago and undo the progress that has already been made.

"Success can be achieved if we work in partnership," the Senator explains.

Senator Hollings and Senator Warren G. Magnuson (D-Wash.) last summer asked the Administration to put together the background and recommendations for an ocean use initiative. This document is a key to solving the problem, which is getting more complex daily. The Administration has promised action, but we are still waiting. Perhaps Capitol Hill can light a fire at 1600 Pennsylvania Avenue. A letter to your representatives here would help.

#### More Ascent Studies

The heads of major scuba certifying agencies met here recently and uncovered a list of "we don't knows" in the field of emergency ascent training.

Of the 1.5 million sport divers trained since 1970 there have been only 28 fatalities during emergency procedures training. Statistically it's a non-problem, said one of the participants at the meeting, "but you can't tell that to the survivors."

He said the loss of only 28 still isn't acceptable.

The "we don't knows" included anxiety, panic and their effects on emergency ascent. Also in this category are the long-term effects of pulmonary disorders and cigarette smoking. But the conferees did reach several interesting conclusions. Among them were the following:

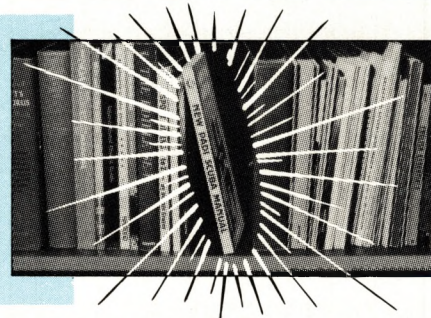
A diver in an emergency ascent situation needn't look toward the

*continued from page 132*

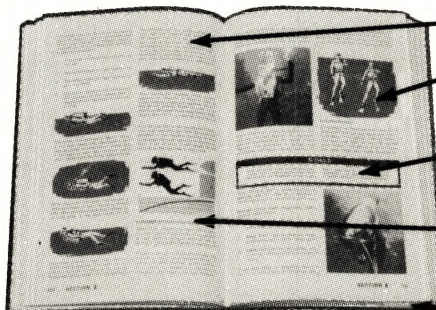
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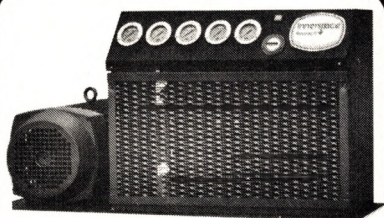
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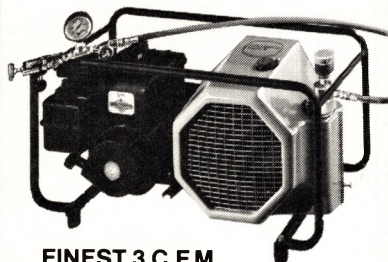


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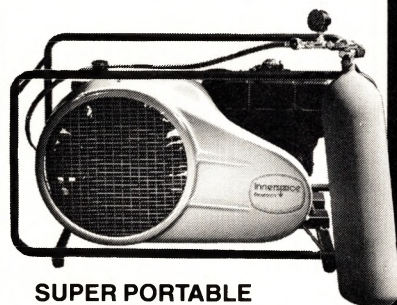
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# INSTRUCTOR NOTES

## Training Recommendations for Cave Diving By Sheck Exley

I am going to begin this article in a rather unorthodox fashion by listing some of the reasons why the reader should not dive in underwater caves:

1) It is quite possible that a fatal accident is more likely while engaged in cave diving than in any other commonly-practiced type of diving.

2) In order to cave dive with what this writer would consider a reasonable degree of safety, one should spend a great deal of time, effort, and money, approximately \$2000, on equipment and training.

3) The heavy traffic, probably in excess of 50,000 divers per year, in North Florida's underwater caves is having seriously adverse effects on the ecosystems of those caves, as well as on landowner-diver relations.

For these reasons, I would like to discourage readers from taking up cave diving. However, if you are bound and determined to cave dive anyway, here are the things that are recommended for cave diving with the highest degree of safety.

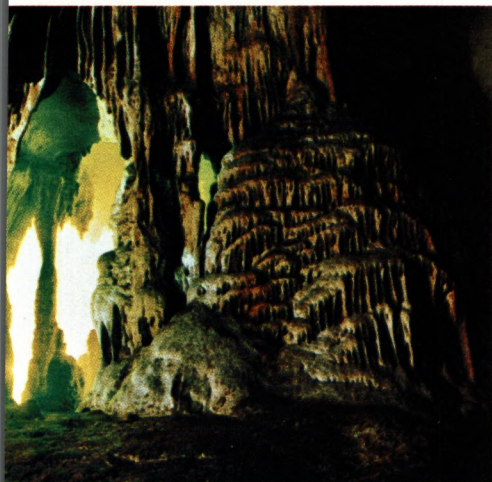
Before you even think about cave diving get a thorough background of experience in open water diving. Of course this open water experience should



PHOTOGRAPHS BY BOB WALLACE



*Cave diving must be studied and prepared for very carefully. Equipment and training costs are high, and the traffic in North Florida caves is damaging the long tunnels that are a vital part of the state's natural fresh water storage system.*



begin with a basic scuba certification course. FSDA, NAUI, YMCA, PADI, NASDS and several other organizations have fine basic courses. While not as well known as the others, FSDA (Florida Skin Diving Association) is particularly applicable in this instance in that most FSDA instructors are trained in Florida and therefore have at least a vague idea of what is involved in cave diving in a north Florida spring, even if they do not themselves profess to be cave divers. However, this is only the beginning. Generally speaking, the more training you have before you attempt a cave diving course, the better. Completion of an advanced course is a must, a dive master or even an instructor rating is not a bad idea. Meanwhile, get as familiar with scuba gear as possible under actual open water conditions. As a bare minimum this should include at least 25 dives on 25 days for 15 hours cumulative bottom time, including a few night dives.

We are growing more and more convinced of the necessity for a background in dry caving as well as diving for cave diving. This enables one to become familiar with cave structure and features and the hazards of narrow passages, cave ceiling, and absolute darkness without the stress of having to worry about running out of air or kicking up silt. Most organized caving in this country is pursued under the auspices of the National Speleological Society (NSS), which has over a hundred chapters all over the United States. Most of these groups welcome new members, and offer free training in caving techniques. If you are unsure of what chapter is nearest you,

*continued next page*

## 1978 INSTRUCTOR TRAINING COURSES (ITC)

*The following list is for quick reference only. For more information contact the appropriate organization directly.*

### NASDS

April 3/San Diego, CA  
June 26/San Diego, CA  
Sept. 25/San Diego, CA  
National Association of Skindiving Schools  
641 West Willow St.  
Long Beach, CA 90806

### NAUI

April 8/Rockport, MA  
May 5/Canadaigua, NY  
May 14/St. Johns, Quebec  
May 21/Austin, TX  
June 9/Europe  
June 10/San Diego  
June 17/Freeport, Bahamas  
June/New Brunswick, Canada  
July 16/Philadelphia, PA  
July 19/Ann Arbor, MI  
August/Quebec, Canada  
August/British Columbia, Canada  
August 11/Chicago, IL  
August 13/San Francisco, CA  
August 18/Ontario, Canada  
Sept. 2/Melbourne, FL  
National Association of Underwater Instructors  
Box 630  
Colton, CA 92324

### PADI

April 3/Jacksonville, FL  
April 9/British Columbia, Canada  
April 21/Chicago, IL  
April 22/San Diego, CA  
May 5/Jacksonville, FL  
May 6/Chicago, IL  
May 20/San Marcos, TX  
June 3/St. Louis, MO  
June 11/Bad Tolz, Germany  
June 12/Jacksonville, FL  
June 17/San Diego, CA  
June 18/Ft. Pierce, FL  
June 19/Jacksonville, FL  
June 24/Marquette, MI  
June/Okinawa  
July 1/Ontario, Canada  
July 8/British Columbia, Canada  
July 9/British Columbia, Canada  
July 15/San Diego, CA  
August 4/Jacksonville, FL  
August 8/Stevens Point, Wis  
August 12/West Indies

August 12/Albuquerque, NM  
August 12/Long Island, Bahamas  
August 26/Chicago, IL  
August/Selinsgrove, PA  
Sept. 9/San Diego, CA  
October 21/San Diego, CA  
October/Okinawa  
November 3/Jacksonville, FL  
November 23/Bermuda  
December 2/San Diego, CA  
Professional Association of Diving Instructors  
2064 N. Bush St.  
Santa Ana, CA 92706

### PDIC

April 3/Monterey, CA  
June 26/Monterey, CA  
Sept. 18/Monterey, CA  
Professional Diving Instructor College  
598 Foam St.  
Monterey, CA 93940

### SSI

April 1/Vero Beach, FL  
May 6/Mansfield, MI  
May 20/Stratford, CN  
June 10/Ft. Collins, Col.  
August 12/Milwaukee, Wis.  
Sept. 9/Lake Ozark, Miss.  
Nov. 4/Houston, TX  
Scuba Schools International  
1449 Riverside Dr.  
Ft. Collins, Col. 80521

### YMCA

April 15/Traverse City, MI  
April 15/Rochester, NY  
May 6/Rochester, NY  
May 7/Morgantown, W.Va.  
May 20/San Pedro, CA  
June 3/San Pedro, CA  
June 17/San Pedro, CA  
July 29/Los Gatos, CA  
August 12/Los Gatos, CA  
August 26/Los Gatos, CA  
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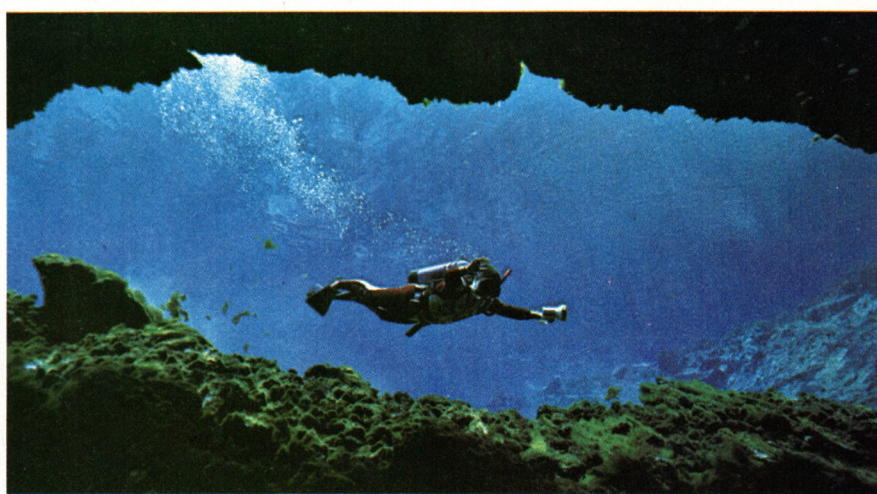
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write the NSS, Cave Avenue, Huntsville, Alabama, 35810 for more information. An added benefit of joining the NSS is that you will hopefully gain an appreciation of how rare and delicate the formations and life forms of caves are.

An excellent intermediate step between open water training and cave diving training is to attend one of the cave diving workshops periodically offered by the Cave Diving Section of the National Speleological Society. These workshops include lectures, discussions, and films on various aspects of cave diving as well as actual guided practice dives for short distances in caves under the watchful eyes of highly experienced cave divers. The workshops usually last a day or two and are offered all over the country. The next one is scheduled for June, 1978 in New Braunfels, Texas, another will be held in Branford, Florida in December, 1978. For more information write: Sheck Exley, Chairman, NSS Cave Diving Section, 1591 South Lane Avenue, Apt. #118C, Jacksonville, Florida 32210.

Another good intermediate step between open water training and the cave diving course is offered by PADI. In order to distinguish it from a full-blown cave diving course it is entitled a "cavern diver" course. However, please don't take the meaning of caverns (synonymous with "cave" or "large cave") literally, the cavern diver course is designed to qualify open water divers for ledge diving in the lighted, shallow areas around and just inside cave entrances. Persons interested in this course should write, PADI, 2064 N. Bush Street, Santa Ana, California 92706.

There are two acceptable routes to attain the final training necessary for cave diving. The easiest way to get this training is to sign up for a YMCA, NAUI, or NACD (National Association of Cave Divers) cave diving course if you are fortunate enough to live where one of these courses is offered. The YMCA probably has the

most active and most readily available cave diving program. For information write: Mary Melton, Rt. 1, Box 175-M, Vero Beach, Florida 32960.

Another source of training in cave diving is to find an experienced cave diver and begin training and diving with him. This one-to-one teaching ratio is probably superior to the class concept as far as cave diving is concerned. However, make sure that the diver you work with is truly experienced and willing and able to teach. If you are in an area where there are no cave diving courses, try contacting local scuba instructors, dive shops or the NSS Cave Diving Section to get the names of experienced cave divers in your area.

It's never a bad idea to supplement your training with additional reading on the subject. The bi-monthly newsletter of the NSS Cave Diving Section, *Underwater Speleology*, is devoted entirely to cave diving and often contains articles on the latest developments in cave diving equipment and procedures. This newsletter is available for \$5.00 per year from Stephen Maegerlein, P.O. Box 60, Williams, Indiana 47470. The NSS Cave Diving Section is also working on a new cave diving manual, hopefully to be in print this summer. A few books and pamphlets are now in print, though most are sadly out of date. Dave Desautels, 12900 N.W. 29th Avenue, Gainesville, Florida 32601, still has copies of the proceedings of cave diving seminars for sale and you can obtain *An Introduction to Cave Diving* from NAUI. About the only thing now available that is not badly dated is Claudette Finley's excellent *Hand Signals for Cave Diving*, which is available from Dave Desautels for \$2.00 a copy.

I will be happy to assist *Sport Diver* readers with any further questions they might have regarding cave diving. My address is: Sheck Exley, 1591 South Lane Avenue, Apt. #118C, Jacksonville, Florida 32210.







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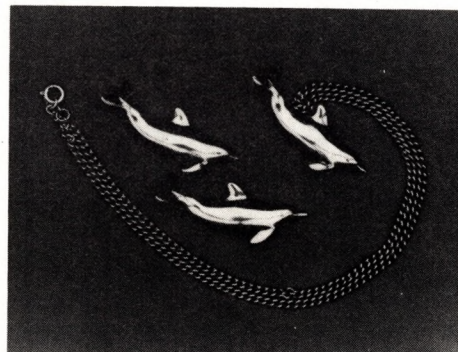
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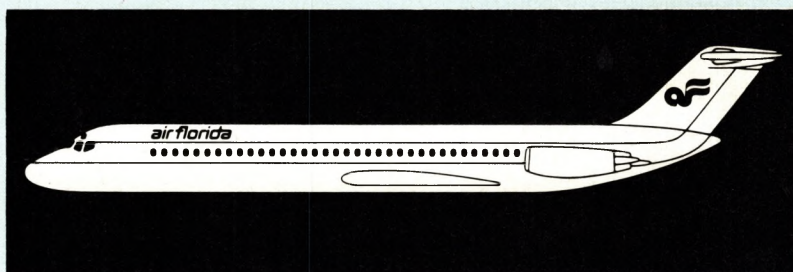
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## A Letter from Senator Weicker

When Senator Lowell P. Weicker talks about the oceans, Washington listens.

Hopefully, it will learn.

Author of a comprehensive study of America's ocean resources and a leading advocate of planned development of our sea potential, the Connecticut Republican is the only official Aquanaut in the U.S. Senate. He received the title two years ago after a saturation dive in Hydrolab, at St. Croix.

Senator Weicker's views on ocean planning have reached a wide and influential audience.

In this article for Sport Diver Magazine he discusses the need for a reasoned oceans policy and tells sport divers how they can play an important role in raising the level of public awareness.

**P. Z. Trupp**  
**Washington Correspondent**

In January I spent several days doing one of the things I love most —spending time in that other world of awesome beauty and mystery which exists below the surface of the Caribbean's blue waters. Unfortunately, the experience was a bit of a good news-bad news situation.

The good news was that I was helping inaugurate the first government-owned underwater habitat, located in the Salt River Canyon about a mile off the north coast of St. Croix. The government bought the habitat from the Perry Foundation for \$50,000 and refurbished it at a cost of \$59,000.

For the first time, scientists and engineers will now have a government facility available for their underwater research and exploration; they won't have to rely on private or foreign owned facilities exclusively as they have in the past.

The bad news was some of the things I saw while I was down for the three-day saturation dive with Bob Wicklund, of my staff, and Bob Dill, head of the West Indies Lab of Fairleigh Dickinson University which is operating the habitat for the National Oceanic and Atmospheric Administration. As we swam around exploring the nearby environment, Dill pointed out several places where the coral had been killed.

The reason? Careless development on the island of St. Croix was resulting in sediment runoff that killed the coral. Environmental insensitivity and mistakes on land were creating ecological damage in the ocean.

Seeing that coral prompted me to think again, sadly, about how history looks like it may repeat itself: just as we have, through ignorance, insensitivity and lack of planning, ravished so many areas of the land, we may be doing the same with sections of the oceans —and for the same reasons.

With the seas comprising 70 percent of the earth's surface, it is only a question of time before the entire world turns to the oceans in a major way to meet its needs for food and fuel. What I fear is that we will wait until the need for these vital elements is so pressing that we turn to the seas in desperation. Then, like we have too often done on land, we will plunder the resources and destroy the environment —and, belatedly, wonder why riches which should have lasted centuries are being expended in decades.

The danger is great that this could happen, especially with the United States. We all know our history — and our national personality. We're terrific in emergencies. Our great strength is that we can do anything in a very short period of time. Our great weakness is that we may do it unsatisfactorily in the course of rushing into it.

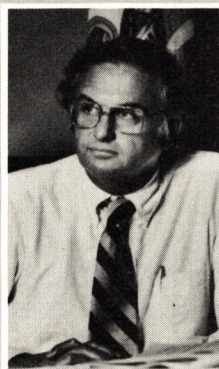


We should'nt put ourselves in a situation where we have to rush into ocean research and development like desperate people driven by hunger and cold. We should now be developing a reasoned, well-thought-out national oceans policy. Continuing to deal with the oceans without such a policy, on an ad hoc basis, is needless, senseless —and, ultimately, may prove dangerous.

A vital first step toward development of such a policy is to end the fractured administration of ocean programs which now exists in the federal government. Ridiculous as it sounds, there are 21 federal organizations in six departments and five agencies involved in deciding how this country should proceed regarding the oceans. There is no way we can have a coherent, coordinated approach to ocean research and development with that mishmash.

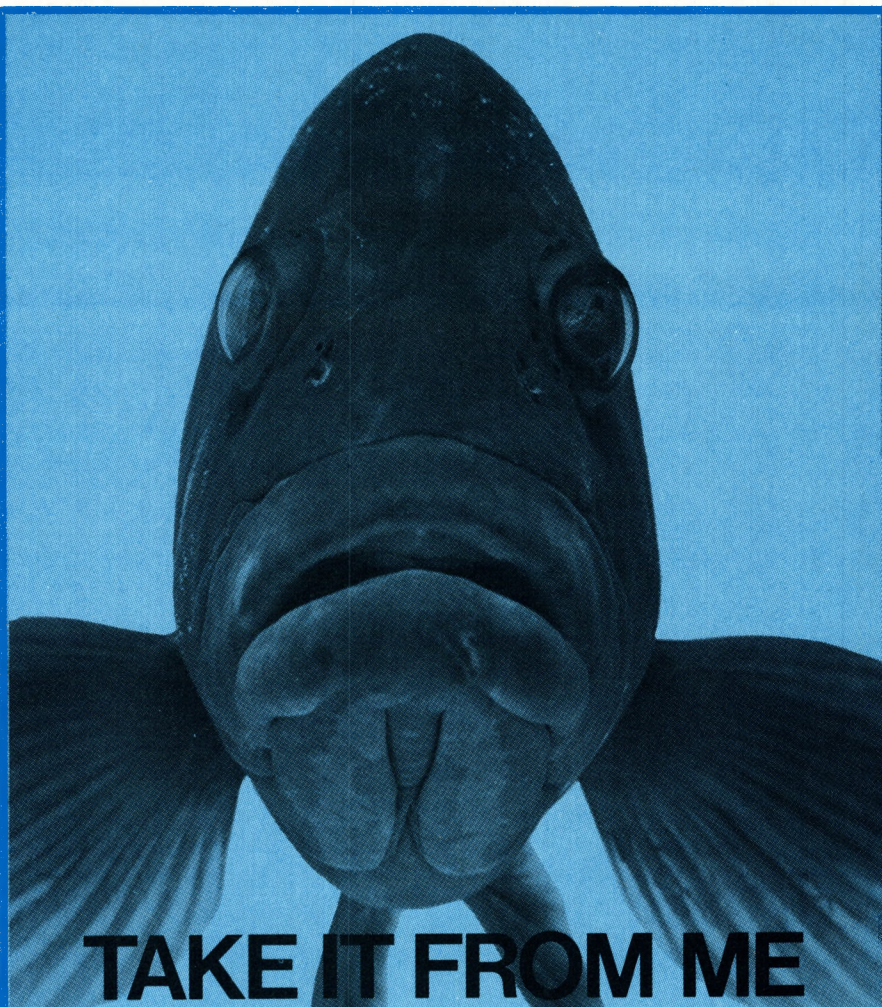
Among the most important elements of a long-range ocean program should be:

- Systematic monitoring of living and non-living resources and research into the interrelationships of these resources;
- Systematic monitoring of all parameters that impact the living resources, such as temperature and oxygen changes;
- Close investigation of the long and short-term impact of man's activities on the ocean environment and resources — we must be aware of how even minute influences could, over years, be detrimental to the fragile ocean environment;
- Adequate support and funding for a solid scientific program — presently, NOAA and other agencies do not have this and we cannot expect to learn what we need to know about how to live, farm, explore and mine in the oceans without an upgraded federal program.



Of vital importance to development of a national ocean policy and program is more support from the executive branch of government. It is critical that President Carter take an active interest. And it is long past time for NOAA to shed its reluctance to ask for much-needed money and programs and to bring the problems of the oceans to the public's attention.

*continued next page*



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The British Sub-Aqua Club, founded in 1953, is the World's biggest diving club — and "Triton" is its magazine, firmly established as the leading dive journal in the English language outside the United States.

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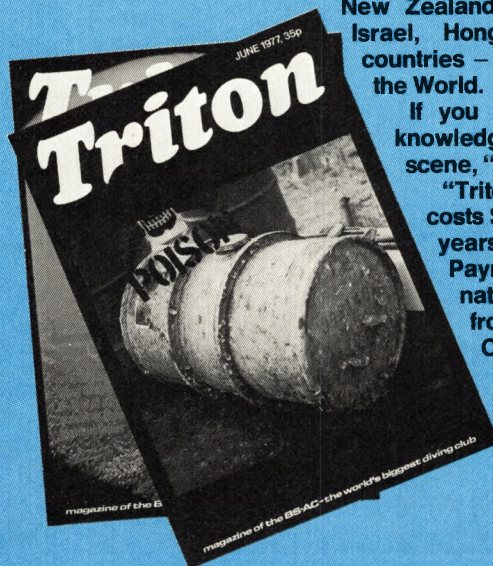
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(Please Print)

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Public awareness and knowledge is absolutely vital to development of a national policy. Nothing in this country goes very far without public support. We cannot expect to get needed money or important laws strengthened or fully implemented without public pressure.

In this respect, the sport diving community can play an important role in raising the level of public knowledge and awareness about ocean science. Those millions who have sensed, firsthand, the thrill of that liquid wilderness should be vocal advocates to their elected representatives and active proselytizers among non-divers. No amount of magazine ink or television film can be as convincing as the personal experience of a friend who has seen the delicacy of coral, the grace of fish, and the brilliantly colored sponges.

Sport divers can do a bit of research themselves, also. Those who want direct involvement in ocean service should contact the American Littoral Society in Sandy Hook, N.J., which has state chapters that invite sport divers to participate in observing, counting and logging of marine organisms for purposes of cataloging these animals for science. More of this type of activity is needed.

### Scubanews

"Scubanews", a new monthly newsletter for divers will be published this June and will emphasize affordable diving. The first issue features a new dive package to Cuba, little known Florida dive spots and the Lighthouse Reef of Belize. The newsletter will also contain 'how-to-do-it' tips and reports of interest to divers such as island camping, seafood preparation, shelling, spearfishing, protecting gear, new products and book reviews. It will contain no aids for diving concessions or products. One year subscriptions are \$9.50 from Scubanews, P.O. Box 1216, Gainesville, Florida 32602.

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# YESTERDAY'S HERO

## TODAY'S BAD GUY

By MIKE LEE  
Reprinted courtesy of NASDS  
Photo by BOB WALLACE

There was a happy time for them. They would test themselves against the inhabitants of an alien world and if successful, savor the taste of their accomplishments until next week when it would happen again. They took pride in their prizes but, abruptly, something happened. They could no longer boast of the ones that got away, or the good spots to go to. The mystique that seemed to surround them disappeared as they shouldered the blame for a diminishing fish population around local reefs. And so today's bad guy emerges — the spearfisherman.







Only through intelligent and thoughtful conservation will we be able to enjoy our resources; both now and in the future. No spearfisherman with a grain of sense wants to see a reef wiped out, or to be involved in any fish slaughters.



Remember the diving publications ten years ago? Cover stories of spearfishing trips were commonplace. Columns written by and for spearfishermen, ads for spearguns, and tips on how to clean and cook your catch filled the pages. Not quite the same today, is it?

Admittedly, there have been reasons for some of the negative attitudes towards spearfishermen, not the least of which are those who needlessly take excessive numbers of game, or who refuse to exercise good judgement. This unrepresentative minority is often used to judge others in our society. Spearfishermen are not without their irresponsible minority. A resident of the Florida Keys spots some idiot spearing an angel fish, so all divers who come to the Keys are after angels. A Massachusetts game warden nabs two clowns in Gloucester carrying ten undersized lobsters and the word spreads like wildfire that the divers are wiping out the lobster population. The small percentage of divers who shoot or grab anything that swims, floats, or crawls have contributed to the overall distaste the public, and even some divers, hold for spearfishermen.

Perhaps if the small percentage of spearfishermen were the only ones to blame something constructive could be done, but there are other reasons for the public anger directed at the underwater hunter. Alligator Reef in the Florida Keys, once a monument to the variety of marine life in Florida, now looks like a Cape Cod town at 4 a.m. on a winter day — deserted. So what happens? The word starts like a slow rumble in a hungry stomach, and progresses to a roar of deafening proportions. It's those rotten spearfishermen! They're wiping out our reefs! No one bothers to question the impact of the scores of sport fishing boats that float over the reef, and all memories of amateur and professional tropical fish collectors disappear. In some cases, these last might better be referred to as fish



Richard H. Stewart

gatherers, since a collector implies a rather selective individual, and certain tropical enthusiasts have been gathering much more than collecting.

Even Ned and Nancy Native, residents of the Keys for 20 years, forget about their own weekly activity when the time comes to point a finger at someone. Every Saturday, Ned and Nancy fire up their 16-footer and cruise out to the reef to sink their hooks into a few inquisitive hog snapper. Multiply Ned and Nancy by the other residents who enjoy a Saturday night fish fry, compliments of Alligator Reef, and you have a minor assault on the reef. Yet these activities seem to be forgotten amid the sighs of relief that

accompany the discovery of a scapegoat — the spearfisherman.

This all leads to a very serious situation for those who enjoy stalking their meal underwater. As is the case with most minorities, the spearfishermen have only a small voice in their own affairs. The weekend hunter is an easy target for legislation that will appease the appetites of larger groups of lobbyists.

Conservation is a word that has been thrown around so much that it has all but lost its true meaning. It is far too easy for some to limit and restrict others under the guise of conservation. Restriction and limitation are not necessarily synonymous with conservation; realizing this is the first step towards improving the inequitable situation that now exists.

The second step is the most difficult, we need dialogue. If spearfishermen, conservationists, residents of the affected areas, and other interested parties would sit down and talk, all the groups involved could profit. Constructive regulations that are aimed at safeguarding fish populations instead of repressing water sports enthusiasts would be a welcome change.

If a representative body of spearfishermen were involved in the writing of necessary legislation along with representatives of other groups, the laws would be more equitable and, hopefully, would ease the bitterness that is growing daily. Involving spearfishermen in the drafting of regulations would also give them a great incentive to enforce the new rules, to police their own ranks. Only through intelligent and thoughtful conservation will we be able to enjoy our resources; both now and in the future. No spearfisherman with a grain of sense wants to see a reef wiped out, or to be involved in any fish slaughters.

Today's underwater bad guy is not without faults or shortcomings. It's about time, however, that the finger was pointed elsewhere, or better yet, not at all. Let's stop talking about the problem and get to work on the answer!



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planned our dive for a no-decompression ending; with time and depth marked on the slate and tables tucked into a wetsuit pocket for safety, we descend along the plumb line. The wall is immediately visible, and pausing at 60 feet, Arcia is an orange and yellow speck in the vast blueness that wells up from the ocean floor.

Free falling along the Canyon face, the countless feet of coral, sponges, gorgonians and sea whips tick off like skyscraper floors seen from a glass elevator. Each level reveals new types of growth; huge, colorful sponges, brain coral heads six to eight feet across, sea fans, and crinoids. Reaching my terminal depth, I flare back to see the Acero resting on the surface, a rowboat-size shadow outlined by the immense black coral branches that grow profusely at this depth. Luis joins me, pointing towards an undercut shelf. As we swim through the cut, I can almost hear the coral groaning under the weight of the burgeoning growth it supports. Time up, we head slowly for our rendezvous aboard the Acero.

Each diver has had a different, intense experience in Blackbeard's Canyon; each sure that his dive was best. Phil and Larry who went deeper than the rest are cursing the laws of physics, longing for one more deep shot on the wall. I really want a closer look at those black coral trees, and Richard and Kathy are quickly reloading Nikonoses.

The Acero has moved to Arco Iris (Rainbow) Reef, only a mile from the wall. The reef here is shallow, in 15 to 25 feet, so we are assured unlimited no-decompression diving for the rest of the day. The 150-foot-plus visibility we experienced on the wall is deteriorating due to heavy southeast winds, which stir the shallow sand bottom, but not before we cover several acres of the rambling reef complex. Almost directly under the Acero a statue-like colony of pillar coral reaches up 12 feet from the bottom. Its recesses are inhabited by hundreds of tiny blennies and some of the usual Caribbean reef species. The sprawling reef houses an even greater variety of fish than the wrecks: squirrel fish, blue wrasse, chromis, angels, parrotfish and triggerfish among them.

Arco Iris grows in long barrow-like mounds with bare sand in between. In one of these trenches between the coral, Kathy and I corner a leopard ray with a wingspan of four to six feet. It remains on the bottom as we approach, taking flight as we cross some imaginary territorial line, up across a coral mound into another trench. The ray is very fast, and we are very slow, but we follow the ray from trench to trench until it grows tired of the game and flaps off towards the green horizon.

There are large brain corals and some basket sponges on Arco Iris, and these are usually inhabited by the smaller tropicals that pose, bright blossoms in a bed of undersea perennials, moving on after the photographer has finished the portrait.

On the cruise back to El Colony we consume many Hatueys, and are rewarded

with a pots-and-pans concert led by Luis and Arcia. The clattering calypso chorus echoes faintly off into the Caribbean dusk as the southeast winds increase their tempo.

At the El Colony we invade the normally quiet bar, and at the insistence of Luis and Alex, Phil, Richard and I pick up the house band's equipment and render a few bars of American rock 'n' roll, the kind that was just reaching its vogue in 1959, and is therefore unfamiliar to Cuban listeners. The bar crowd, more accustomed to calypso and folk songs like "Guantanamero" than to Chuck Berry and the Rolling Stones watch intensely. Heads bobbing and toes tapping, they seem to approve of the yanqui music.

The customary wake up call is not on time the next morning. A rare front blowing in from the southeast has the ocean in turmoil, pounding the unprotected south side of the island that harbors the best diving spots. Instead, we're free to enjoy some of El Colony's other recreational facilities: Skeet shooting, billiards, sailboats, paddleboats or horseback riding. Larry is immediately off to shoot with Luis. While Phil chooses a sailboat, Alex and Richard try on a few games of billiards, and Kathy, Noel, and I take several uncooperative horses for a ride.

The topography of the island is generally flat, but there are a number of granite hills that pop up like bread loaves from the smooth, green terrain. We head for the nearest hills, several miles away across gravel roads. At least Noel and Kathy head for the hills; my mount somehow senses my reluctance to pressure him, and refuses to budge. No amount of pleading, cajoling or threats can move the statue-like beast. Noel, a superb rider, waves a large stick in front of my horse, and after a swift kick in the butt, he is inspired to render an uneven trot that reminds me of a '62 VW I once owned that had loose rods.

On top of the granite hill, we're able to look out across the whole of Siguanea Bahia and the farm and range lands that surround it. This vantage point has served other purposes. An abandoned navy watch post and barracks are concrete reminders of a time when there was something very real for the Cuban navy to watch for. Deserted now, they are simply an interesting exploration for two American tourists and their Cuban friend.

Heading back to El Colony my dispirited mount finds his second wind; most likely he knows a good feeding and rubdown wait just down the road. Nothing I scream can slow the fool down, and the other horses, seeing the potential for a race, decide that a dead run is the best way to get back to the feedlot. I pull frantically at the reins; cameras slung over each shoulder bounce painfully off the ribs and I can feel the beginnings of a five-inch blister forming on my rear. Finally, after I make several unprintable remarks concerning the horse's immediate ancestors and some threats, he stops — at the entrance to El Colony.

Our Cubana Air turbo-prop is late the next morning, so we have time to relax at the Nueva Gerona Airport, hanging out in the coffee shop. Because both tourism and all retail sales are controlled by the government, the only place you can spend money is in specially

designated tourist shops or restaurants. Phil consumes one more cup of coffee and attempts to smoke a pack of Populares, the native cigarettes. If they are popular with the local populace, they haven't found much favor among our group. Phil, who ran out of Camel Filters Tuesday, has tried every brand available, including the special Kim imports. According to him they are uniformly poor substitutes for pure Virginia blend; I find they taste a lot like King Edward cigars.

Back in Havana, we freshen up for something special — a night at the Tropicana. A famous vice pit of the Fifties, the Tropicana was the archetypal Havana night club. Walking under a neon arch we enter the ante room which is tastefully decked out with expensive carpet and several Chinese porcelain vases. Through the ante room, we are in the Tropicana, which is a huge outdoor garden, overhung by giant oaks and palms. Our table is right up front, and as we're sitting the mechanized wooden stage begins to crawl into place next to us. Despite a fine mist, forerunner of the front that spoiled our diving, the singers and dancers act out their parts commendably. A chorus line descends from a catwalk high in the trees, lit by orange and green floods, but the performance is cut short by the rain. Sadly, we trot out of the cabaret towards our bus and pass the rest of the night in the Copa Room at the Riviera.

Upstairs in my room I look out at the rain-blurred lights of the city, and at the waves crashing over the sea wall, spilling their fury onto the Malecon. Somewhere within my sight lies the broken wreck of the USS Maine, the remains of a mysterious incident so long ago that set two countries on a collision course that was inevitable — and violent.

The wake up call is early again. After an appropriate Breakfast we head for Jose Marti Airport and our Piper. Checking through customs is painless, our baggage is collected on a cart and we load up as the rain moves in. We shake hands all around with Noel, Tony, who has rejoined the group, and Alex, who will catch his own flight tomorrow. Taxiing quickly we are airborne; Larry is relaxing in the left seat. Phil has put in his bid for a front seat two days ago, so I'm in the back, looking back as the rain rings down a gray curtain across Havana. I close my eyes and dream about the double cheeseburger, root beer and greasy french fries I'm going to eat for Lunch the minute we touch down in Jacksonville . . .

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# SAFE SCUBA<sup>®</sup> DIVING TABLES



ENTER TABLE HERE

**TABLE 1-11 A**

**DEPTH (feet)**

**NO DECOMPRESSION LIMITS MINUTES**

**REPETITIVE GROUP DESIGNATION LETTER**

**TABLE 1-12 A**

**INTERVALS**

**SCUBA**

**REMAINING (TR) IN MINUTES**

**TIME REMAINING (TR) IN MINUTES**

**TABLE 1-13 A**

**REPETITIVE DIVE TABLES**

**RESIDUAL NITROGEN TIME (RNT) IN MINUTES**

**TIME REMAINING (TR) IN MINUTES**

**TABLE 1-11 A**

**DEPTH (feet)**

**NO DECOMPRESSION LIMITS MINUTES**

**REPETITIVE GROUP DESIGNATION LETTER**

**TABLE 1-12 A**

**INTERVALS**

**SCUBA**

**REMAINING (TR) IN MINUTES**

**TIME REMAINING (TR) IN MINUTES**

**TABLE 1-13 A**

**REPETITIVE DIVE TABLES**

**RESIDUAL NITROGEN TIME (RNT) IN MINUTES**

**TIME REMAINING (TR) IN MINUTES**

This provides the first clue to our dilemma. The Navy tables were not designed for sport divers. They were designed for use by professionals who would be using them on a day-to-day basis thereby reinforcing and maintaining proper proficiency levels. The Navy tables were designed as separate entities so divers could mix decompression and nondecompression repetitive dive schedules. This aspect of Navy table design creates many chances for calculated errors simply because of the mechanical difficulties of changing from page to page to plot each segment of a



repetitive dive schedule.

The modified dive tables solved the mechanical problem by integrating three separate Navy tables into a single system for no-decompression dives. However, they included certain problems inherent in the original Navy tables. They used the 190 foot depth limit of the Navy tables instead of setting a safe depth limit for sport divers. They also overlooked the problem of repetitive dives shallower than 40 feet having insufficient residual nitrogen time charged against them. The exact description of this particular table anomaly (the "40 foot RNT anomaly") requires a detailed explanation beyond the scope of this article. You can work it out for yourself if you study two divers making identical first and last dives together to depths of 60 feet or more. However, one of the divers makes an additional 20 foot dive between the two deep dives. You will be surprised to find out that the diver who stayed on the surface between the first and last dives is actually two or even three repetitive groups closer to decompression than the diver performing the extra dive to 20 feet!

Let us continue our analysis of the NASDS Safe Diving Tables to demonstrate some of their more outstanding features. 1) A safe depth limit of 140 feet has been established to coincide with the U.S. Navy limit for divers using open-circuit scuba and to protect against bounce dives (bottom time less than five minutes); 2) The "40 foot residual nitrogen time anomaly" was protected against by removing bottom time data for depths below 40 feet; 3) The three tables used for no-decompression dives were integrated into a single easy to use system; 4) The table design makes it easy to retrain divers familiar with any other table system including the standard U.S. Navy tables; 5) The distinctive coloration and inherent table design reduce the chances for table calculation errors considerably; 6) An abbreviated version of the U.S. Navy decompression table (T1-10) is provided in case a diver makes a dive performance error. It is made clear that the NASDS Safe Diving Tables are not to be used for decompression diving; 7) Distinctive coloration in T1-13A warns the diver against decompression situations with red (*stop*), alerts the diver to residual nitrogen time with yellow (*caution*), and points out the safe time remaining at depth with green (*safe to proceed*); 8) The tables system also contains a surface interval time wheel to provide greater ease in adding time for accurate repetitive dive scheduling; 9) The Safe Diving Tables system is also a component of a total dive planning system which includes the

NASDS Log Book and the NASDS Dive Planning Slate.

How would you like to have a set of tables you could learn to use accurately in ten minutes or less and still remember one

year from now? The best way to demonstrate this point is to have you learn to use the NASDS Safe Diving Tables right now. Use the table reproduction provided for working the following dive schedule.

D	(1)	Depth (Dive 1)
BT	(2)	Bottom Time (Dive 1)
RG	(3)	Repetitive Group
SI	(4)	Surface Interval
RG	(5)	Repetitive Group
D	(6)	Depth (Dive 2)
RNT	(7)	Residual Nitrogen Time (Dive 2)
TBT	(8)	Total Bottom Time
RG	(9)	Repetitive Group

Refer to Table 1-11A, opposite page.

A diver wishes to perform an initial dive of 70 feet for 20 minutes. Start at the top of the table system (T1-11A) using the yellow row marked "Depth". Move from left to right until you find the 70 foot depth column (1). The table depths are presented in 10 foot increments from 40 feet to 140 feet. The standard table depth rounding rule applies: If the exact depth is not represented on the table, move to the next greater depth listed. Move down the vertical column described by the 70 foot depth. The next number shaded in yellow is the no-decompression limit of 50 minutes. Continue vertically down the column until you find your planned bottom time of 20 minutes (2) shaded in orange. Always make sure your planned bottom time is less than the no-decompression limit. The standard table bottom time rounding rule applies: If the exact bottom time is not represented use the next greater bottom time listed. Follow the horizontal orange row to the right to discover your repetitive group (3) upon completion of the 70 foot dive for 20 minutes. You are an "E" diver.

Now the diver wishes to remain on the surface for one hour, thirty minutes prior to re-entering the water for a second dive. Stay in the orange row described by repetitive group E and continue to move to the right until you reach the time interval containing one hour, thirty minutes (0:55 to 1:57) (3). Now move vertically in the column described by the surface interval to the repetitive group (yellow row) at the bottom of T1-12A. You are a "D" diver (5) upon completion of the surface interval.

The diver wishes to make a second dive to 60 feet for 30 minutes. Continue down the vertical column described by your new repetitive group into T1-13A until you reach the row contained by the 60 foot depth (6). Your residual nitrogen

time for a D diver at 60 feet is 24 minutes (7). The residual nitrogen time is shaded in yellow meaning: "Caution, time against you." There is also a number, 36, shaded in green meaning: "It is safe to spend 36 minutes at this depth." The number shaded in green is the time remaining at depth. It is obtained by subtracting the residual nitrogen time from the no-decompression limit for that depth. The table has performed the computation for you, reducing the possibility of error. The planned bottom time was for 30 minutes and did not place the diver in a decompression situation since it was less than the time remaining. The total bottom time is obtained by adding the residual nitrogen time of 24 minutes to the actual bottom time of 30 minutes to obtain a total of 54 minutes (8). Return to the top of the table T1-11A, and enter at the 60 foot depth column (6). Move vertically down the column, noting that the 54 minute total bottom time does not exceed the no-decompression limit of 60 minutes at 60 feet. Continue down the vertical column to the table bottom time of 55 minutes, orange row, (8). Move to the right in the orange row to obtain your repetitive group upon completion of the second dive. You are now an "I" diver (9).

Table T1-13A provides some major advantages for dive planning. Study the slate data on the log book page below dive number two in the example. The diver with the repetitive group of D may remain at 60 feet for 36 minutes, 70 feet for 30 minutes, 80 feet for 22 minutes, and 90 feet for 14 minutes without having to decompress. This information is transferred to the Dive Planning Slate and carried with the diver on the dive. If the diver should exceed the planned diving depth for some reason, a quick check of the slate would provide the safe time remaining for the actual depth obtained. The diver may now accurately re-evaluate the dive plan and safely stay out of decompression.





continued from page 117

surface if he or she is fully conscious. Exhaled air will escape properly. But an unconscious victim's head should be hyperextended on the way up by a rescuing buddy.

Exhalation to tidal volume may cause problems. During ascent it's best to keep lung volume at mid-range.

Taking a regulator out of your mouth in an emergency can lead to danger. It's best to hold it in place and hopefully gain a little air when pressure is reduced near the surface.

The octopus isn't fail-safe. It may not work properly with two divers breathing off of it. One problem may be that the tank orifice is too restrictive and won't give enough air for two at depth.

Mixing different brands of second stage regulators to make an octopus can lead to serious trouble. It's safest to have second stages of the same brand.

The certifying agencies are concerned about insurance. They are seeking a 100 per cent safety record before the insurance companies start having second thoughts about scuba instruction. The agency heads have met twice already and more meetings are planned. Eventually they will issue a full report on emergency ascent training with emphasis on a fail-safe approach.


## USSR Sees No Devil

Last year the Soviet Union participated in project 'Polymode,' a five-nation scientific expedition to study the Bermuda Triangle, which is infamous for its mysterious ship and aircraft disappearances. These occurrences have been linked to everything from waterspouts to little green men.

The Soviet team, meeting informally with Washington researchers, reported they couldn't find anything about the area which might account for all the mysterious happenings.

"We studied the structure under the ocean and the atmosphere around it," said expedition leader E.I. Baranov, "and we could discover nothing supernatural, no inexplicable phenomena going on out there."

Maybe not, but if the Soviets want to study mysteries they should spend more time in Washington, where the Carter Administration's posture on the oceans is more mysterious than ever. With so much work to do and so little action it leads one to wonder: Is Mr. Carter waiting on word from the Triangle?



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# WARM MINERAL SPRINGS

*continued from page 88*

Over the next five years the project uncovered a 10,000-year-old burial site; the fang, facial bones, and vertebrae of a smilodon (sabre-toothed cat); the articulated skeleton of a ground sloth; and what was perhaps the most startling find, part of an atlatl (spear thrower), the oldest yet found in the Western Hemisphere.

From evidence found in the spring; leafy mold, pollen, artifacts, and human and animal remains, Cockrell and his co-workers have put together a rough sketch of early man in Florida. Twelve thousand years ago, the Earth was in the declining years of the last great Ice Age, and much of the world's water was frozen in glaciers that covered large portions of the Northern Hemisphere. As water accumulated in the glaciers, the sea level dropped steadily. At this point in time, the Gulf Coast was approximately 80 miles west of Venice, Florida, which is right on the water today, and the sea level was perhaps 180 to 300 feet lower. As the water receded the newly exposed land masses were now some 15° cooler, and their ecology was often very different from that of the present. The climate in Florida seems to have been very similar to that of present day North Carolina, and the people of Warm Mineral Springs were hunters and gathers who tracked their game from water hole to water hole in seasonal cycles. They were small in size; the individual whose skull and skeleton were recovered was apparently about five feet two inches tall and weighed about 125 pounds. Though small in size these people lived in the same time period as, and probably hunted, the megafauna; huge animals such as mastodon, camel, horse, cave bear, sloth, and sabre cats that dominated the Ice Ages.

Assembling the data from which these deductions were made proved to be a long and arduous task. Validation of the site after it had been labeled a hoax predicated a very cautious approach, particularly so as the excavations had to be made underwater.

In the past underwater archaeology has been regarded as the bastard step-child of conventional dry land archaeology and treasure hunting. The rigid control and documentation necessary to establish credibility for an excavation were thought to be impossible to achieve underwater. With this in mind, Cockrell, who had 12 years experience as a terrestrial

archaeologist, began planning his research design.

The spring was first mapped in three dimensions by staff divers of the Florida Department of State assisted by volunteer sport divers. Interested divers from throughout Florida came to the spring and worked without pay, allowing the project to move forward and make the most of the minimal funding available. Using bubble tubes, measuring tapes, p.v.c. guides, and transit levels, they produced a mathematical model that allows any spot in the spring to be pinpointed within two centimeters. By basing the underwater mapping on points established on the surface, the maps were correlated with reference points marked on the official U.S. Geological Survey.

Before the excavations began, the research team investigated an avenue that had never been used before on an archaeological site. Perhaps the most difficult part of establishing credibility for the results of an archaeological dig is establishing credibility for the methodology and procedures used to acquire the data. The State purchased a Hydro Products underwater television camera which was used to record every phase of the exploration of the ledges around the spring and the retrieval of artifacts and remains from those ledges. In all there are some 100 hours of videotape of the Warm Mineral Springs Project that detail every phase of the operation. Viewing these tapes puts you right over the shoulder of the archaeologist, and imparts a real understanding of the excitement of each new discovery. The video camera has a special thallium light source and an image intensifier. Because of the silty waters in the spring, the video technician on the surface often has a much clearer view of what's going on below than the diver holding the camera.

Aside from just recording the procedures, the video soon acquired another very important function. During the project, many non-diving scientists were brought in to direct specific phases of the excavation. Using the video monitor and two-way Kirby-Morgan communications system, paleobotanist Jim King was able to direct divers working below as they gathered leaf mold samples for analysis and dating. It was the video monitor again that allowed Greg McDonald to immediately identify bone fragments uncovered on a ledge as those of a giant ground sloth.

With experts on the surface observing via t.v., the hard labor  
*continued page 138*



# ELECTRIFYING EXPERIENCE



Story and photography  
by Rod Anton

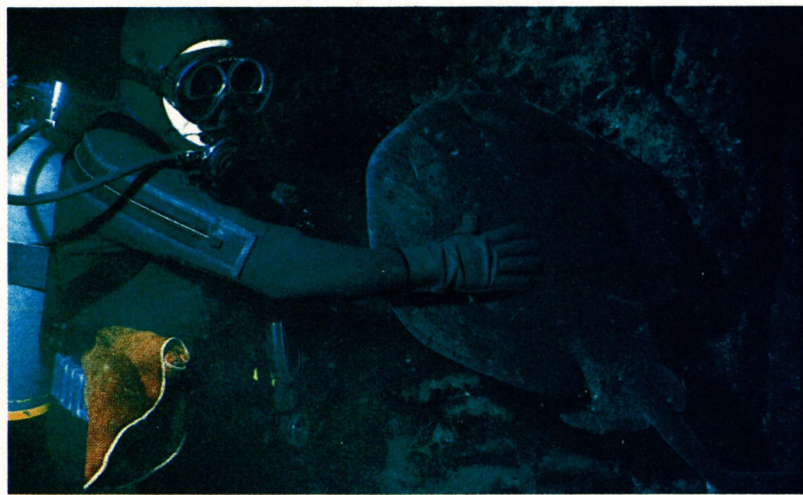
**WE** hung suspended in the dense blue as I watched the dive boat recede into the distance. My buddy, George, signaled our last surface check and we started our descent on the outside edge of the kelp. Twenty-five feet beneath the surface we met the top edge of the reef; the face dropped vertically down to the sand bottom another 50 feet below. George moved slowly toward the wall while I proceeded with my camera check. Finished, I moved toward George, glancing to my right. Twenty feet away, a magnificent creature hung

motionless just above the bottom, a giant electric ray belonging to the genus *Torpedo*. I assumed this one to be a *Torpedo californica*. Frantic with excitement, I lunged for George and got his attention by almost shoving him face first into the reef. I pointed spastically toward the creature while burbling ecstatically through my regulator.


George saw the electric ray and proceeded very slowly along the face of the reef toward the animal. Moving much faster, I made a wide swinging arc away from the ray, slowing as I approached from the seaward side. My adrenaline flowed at an all time high, causing me to

quickly fire off three shots before I realized the strobe was facing backwards. Discovering the fact, I finally managed to get off a couple of good shots when I noticed the creature's eyes were actually closed. I moved a little closer as George came within touching distance. He cautiously reached out and gently petted the beautiful beast. The ray's only reaction was a quick little flutter of the wing tips as though it had encountered a delicious case of goose bumps. Suddenly its eyelids rolled back like two giant iron gates. I could almost hear the loud clanging sound as they slammed into place. Acute vision is not one of the electric ray's assets, so the animal did





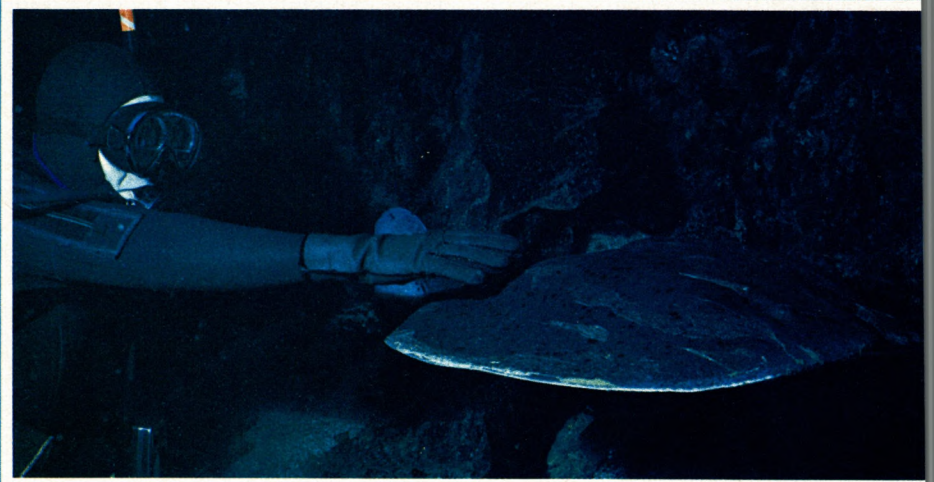
mouth. I thought I heard him say something about having a headache.

As quickly as this electrifying experience began, it ended; the ray turned and slowly glided off into the haze while we surfaced to make sure all was okay. Although George suffered no lasting after effects of the encounter, electric rays should always be admired from a safe distance. While the ray is not an aggressive animal, under the right conditions, an experience like ours could not only be electrifying, but excruciatingly painful as well. 

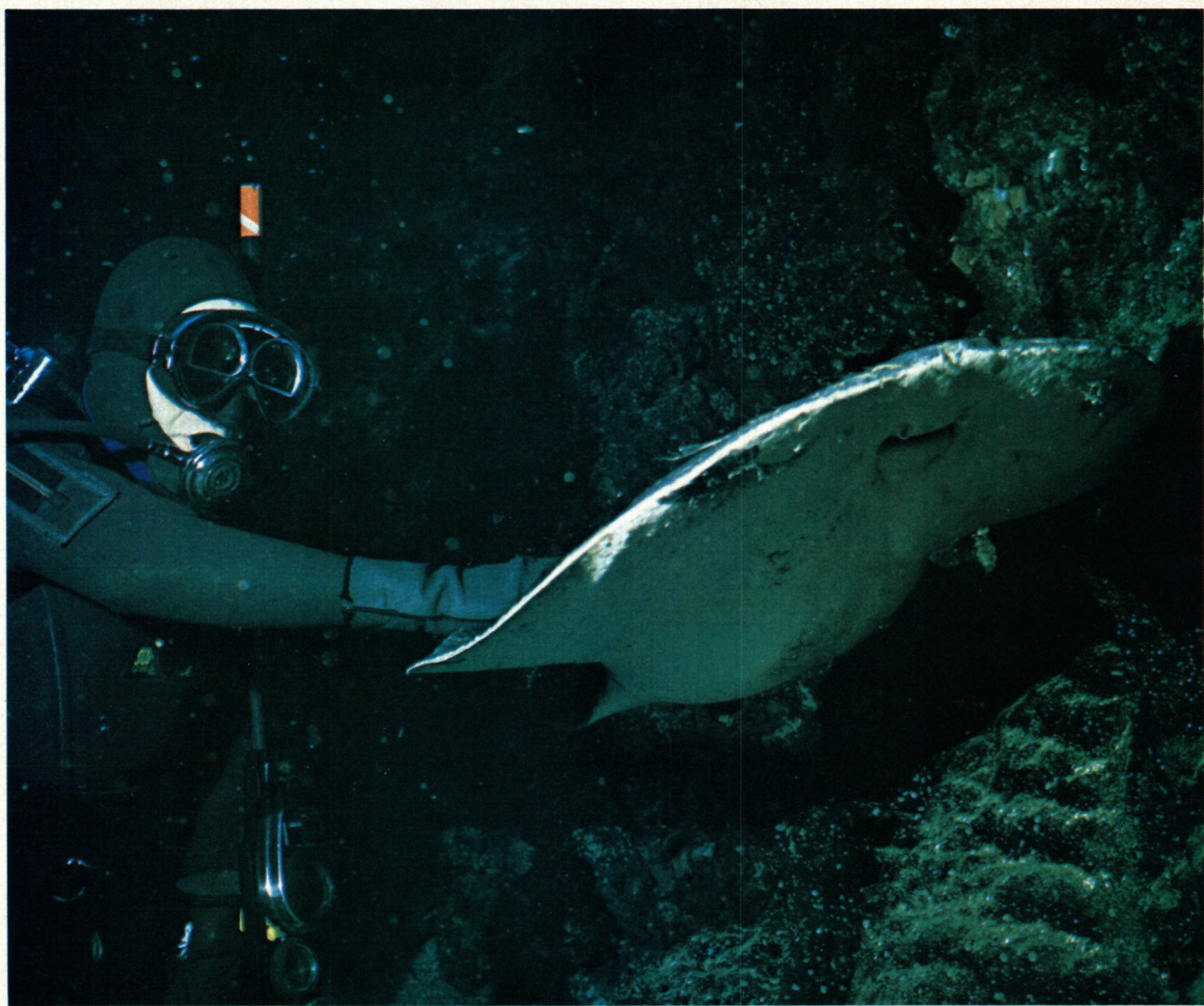
nothing more than tilt at a slight angle as George continued to stroke its back. The creature rotated counter-clockwise until it was facing George, all the while continuing to let itself be petted. The animal eventually moved past George and out of reach but stopped only a few feet past us. George swam around to the creature's front side as I followed behind them.

We were not aware that the electric ray has a large pair of electric organs located near its head, one in each wing. The top surface is positive, the bottom side negative. When discharged, the current passes from the upper surface to the lower surface. Electrical charges of 200 volts and up to 2000 watts have been produced by rays in captivity.

Finally it happened. Now in front of the electric ray, George reached down to scratch its chin. *Z-Z-Zap!* I saw George leap back five feet, shaking his hand as though he had grabbed hold of a live spark plug. The ray didn't make any fast, erratic movements at any time during this encounter but, to our surprise, moved into a vertical position and attempted to wrap its wings around George as though it wanted to make love. Of course George was not in a very amorous mood at this time so, he fended off the ray by shoving a long flashlight in its







The caution displayed by the diver (opposite upper left) proved to be insufficient as this chance encounter turned into a shocking confrontation. After allowing itself to be petted, the electric ray casually discharged a few volts into the diver, then tried to wrap its wings around him. Having taught these buddies a lesson about fondling unfamiliar critters, the ray confidently swam away (left).





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## WARM MINERAL SPRINGS

*continued from 134*

underwater was left to the divers. At one point, they had to lift a three ton rock in order to get at the human burial site that yielded the skull, skeleton and atlatl. Long hours underwater and great physical exertion are a dangerous combination, yet, in three seasons through 1500 dives, there were no incidents or accidents of any kind. Of the 1500 logged dives over 150 were exceptional exposure dives, all of which were completed satisfactorily. The phenomenal success of the diving program which included both Department of State divers and volunteer sport divers can be attributed to the planning and supervision of crew chief and dive officer Larry Murphy who handled the video camera for most of the excavations. As a safety measure, a surface-supplied oxygen decompression stage was placed in ten feet of water. Even with these precautions, all dives were carefully planned to maximize the divers' time underwater while staying well within the limits of the air diving tables.

The Warm Mineral Springs Project has already achieved great successes, yet there remains in the spring much more information of potentially greater value. Sonny Cockrell explained the significance of the site this way, "If we want to see who we were 10,000 years ago, we have to go to the record, the archaeological data. We have a site here where we can see the record of a climate in Florida that no longer exists, with man in association with animals that no longer exist."

The Warm Mineral Springs Project proved that an intensive, multi-disciplinary study of an underwater archaeological site can produce detailed, valid and scientifically acceptable data, but what is perhaps most exciting about the springs site is that, at the bottom of the sink, there is a huge pile of leaf mold, overburden and trash about 120 feet tall. This pile includes everything that ever fell in to the sink, starting back at least 10,000 years ago. On top of the pile are Coke cans and beer tabs; at the bottom there may be some extinct camel, horses and sloths that once inhabited the state and perhaps more human remains as well. Excavating these remains from the bottom of the 220-foot deep sink will take years, possibly more

time than the deposits will last. Although the fossils have lain undisturbed for 10,000 years, during the past 30 years man has acquired the ability to seek and retrieve artifacts underwater. Unscrupulous collectors and thoughtless sport divers pose a grave threat to sites such as Warm Mineral Springs. There is something almost magical about finding the fossilized remains of long-extinct animals and people; yet it is more magical to learn about these species from someone who can analyze and identify that fossil, and perhaps be credited with finding an important link in the search for our past. In 1973 former Florida Secretary of State, now U.S. Senator Richard Stone personally presented Bill Royal with a special commendation for his part in identifying and preserving the deposits at Warm Mineral Springs. Without his perseverance, and the help of dozens of volunteer sport divers, the Warm Mineral Springs deposits could not have been excavated. With this kind of cooperation between scientists and sport divers, perhaps much more important underwater research can be carried out; research that will eventually benefit everyone.



### JAPANESE KILL DOLPHINS

There still has been no official international action taken against the Japanese fishermen who killed 1,000 dolphins earlier this year, or against the provincial government that allowed it.

The fishermen claim that the school of dolphins appeared off their island, Iki, in December, and that they reduced the islanders' catch of cuttlefish and Hamachi by two thirds.

After the fish catch plummeted the fishermen appealed to the provincial government in Nagasaki for permission to hunt the mammals, and the permission was granted.

According to Japanese newsmen who witnessed the massacre, the dolphins were lured to the surf and then bludgeoned or stabbed to death. After the dolphins were killed the fishermen slit their stomachs, carried the carcasses back to the sea and dumped them in. Iki islanders eat dolphin meat and it was feared that leaving the dead mammals on shore would ruin the fishermen's sales.

Some reports of the incident indicated that the fishermen used machine guns loaned to them by the Japan self-defense forces, an allegation that has been denied by official Japanese spokesmen.



## ALASKA

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NASDS Inst.-Full Svs. Scubapro Shop-  
Air-Rentals-2 man chamber-Hydro &  
Tumble-Boat Trips-Catalog Sls-C card  
reqd. 503 Water St., Ketchikan, Alaska  
99901 (907) 225-5020

## ARIZONA

Scuba Sciences, Inc.  
Arizona's Most Active Dive Center  
8502 N. Black Canyon Hwy., Phx., AZ  
85009, (602) 997-7161; 616 S. Myrtle,  
Tempe, AZ 85281, (602) 275-1221

## ARKANSAS

Scuba Hut — Sportsco  
Custom Screening & Transfers-Shirts-  
Instruction-Air-Rental-Boats  
1115 S. Hwy. 71, Springdale, AR 72764  
(501) 751-0636

## CALIFORNIA

New England Divers, Inc.  
Open 7 Days-NAUI-PADI-Certification  
11830 W. Pico, Los Angeles, CA (213)  
477-5021; 3860 Rosecrans, San Diego,  
CA (714) 298-0531; 8363 Center Dr., La  
Mesa, CA (714) 462-4570

Westwind Divers, Inc.  
Full line scuba & deep sea commercial  
equip. center-PADI-NAUI Inst.-All  
services. 2547 Lincoln Blvd., Venice, CA  
90291 (213) 822-4344; 1891 N. Tustin  
Ave., Orange, CA 92665 (714) 974-0740

California Skin Diving School  
1083 N. Harbor Blvd., Anaheim, CA  
92801 (714) 991-DIVE; 9762 Magnolia,  
Riverside, CA 92503 (714) 689-2422;  
1173 N. E St., San Bernadino, CA 92410  
(714) 885-1416; 4420 Holt Blvd.,  
Montclair, CA 91763 (714) 621-4171

Divers Down-San Fernando Valley  
Complete Instruction-Open Water  
Certification-Htd. Pool-Dive Trips-  
Equip. Sales-Rentals. 6742 Reseda Blvd.,  
Reseda, CA 91335 (213) 342-1212

The Underwater Experience, Inc.  
Gateway to Channel Islands Diving-  
Sales-Rentals-Inst.-Air-Charter boat  
dives; 824 Thousand Oaks Blvd.,  
Thousand Oaks, CA 91360 (213) 991-  
4151; (805) 497-0855

## CONNECTICUT

Orbit Marine Sports Center  
NAUI-PADI Instruction. Sales-Rental-  
Air-Trips-Hydro-Visual Insp. 3273  
Fairfield Ave., Bridgeport, Conn. 06605  
(203) 333-DIVE

The Diving Bell  
Sales-Rentals-Repairs-Air-Hydrotest-  
Certified Instruction-Open all year. Dive  
Lake Candlewood. Rt. #7, Rd. 5,  
Brookfield, CT 06804 (203) 775-3573

Will Jacobs Dive Shop  
Sales-Service-Rentals-Hydro-Instruction.  
1153 New Britain Ave. W., Hartford, CT  
06110 (203) 232-8719

Jack's Dive Center  
Sales-Service-Instruction-Rentals-Trips-  
Photography & Commercial Equip.-5000  
psi air-AGA Divator, Rt. 10, Plainville,  
CT 06062 (203) 747-3170

The Scuba Shoppe/Recreation  
Unlimited  
Full service dive shop-Scuba lessons-All  
levels of certification. Foot of Broad St.,  
Stratford Marina, Stratford, CT 06497  
(203) 377-6969

## DELAWARE

First State Sports, Inc.  
Sales-Service-Tours-Air-Rentals-NAUI  
Inst. 4109 Newport Gap Pike,  
Wilmington, Del. 19808 (902) 239-2822

## FLORIDA

Boca Dive Shop  
"The Complete Dive Shop"  
Air 6000-Authorized Repairs-NASDS  
Inst. 251 N. Federal Hwy., Boca Raton,  
FL 33432 (305) 392-9038

Nautilus Dive, Surf & Ski  
Open 7 days a week. Rentals-Air-  
Instruction-Trips-Repairs  
877 E. Palmetto Park Rd., Boca Raton,  
FL 33432 (305) 368-0555

Gulfview Divers Headquarters  
Air-Rentals-Sales-Underwater Photog-  
raphy. Hydro testing-Pool on premises-  
Dive Trips-PADI Inst. 101 Bridge St.,  
Bradenton, FL 33510 (813) 778-3735

Atlantic Scuba Academy  
Complete diver services-Air 5000-  
Rentals-Trips; 114 E. Fairview Ave.,  
Daytona Beach, FL 32014  
(904) 253-7558

Herb's Dive Shop  
Reef Trips-Scuba Tours.  
2434 S. Atlantic Ave.  
Daytona Beach, FL 32018  
(904) 253-7221

The Diving Locker  
Sales-Service-Rentals-Instruction.  
219 Fisherman's Wharf, Fort Pierce, FL  
33450 (305) 461-9960

Allen's Aquatic & Trail Center  
Sales-Service-Inst.-Air-Scubapro-Dacor-  
U.S. Divers-Farallon-Ikelite-Bayley.  
3448 W. University Ave., Gainesville, FL  
32607 (904) 373-9233

# Pro Dive Store Direc- tory

The Professional Dive Store  
Directory is a guide to help you find  
air, service, instruction, and  
information wherever you dive. The  
stores are listed alphabetically by  
cities, which follow the state  
headings in alphabetic order.



The Scuba Shack  
Rentals-Air-Instructions-Trips-Repairs.  
2485 N.E. Dixie Ave., Jensen Beach, FL  
33457 (305) 334-8808

American Diving Headquarters  
Charters to Pennekamp Park-Air-Retail-  
Whsl.-Rentals-Motel Reserv's.-NASDS-  
NAUI Inst. Rt. #1, Box 274-B, Key  
Largo, FL 33037 (305) 451-0037

Bill Crawford's Tropic Isle Dive Shop  
Reef Trips-Air 5000-Rentals-PADI Inst.  
Dive Pennekamp. P.O. Box 755, Key  
Largo, FL 33037 (305) 451-1063

Dolphin Dive Center  
Daily Reef Trips-Instruction-Rentals-  
Group Rates-Charters-Accommodations  
3400 N. Overseas Hwy., Key Largo, FL  
33037; 24 hour hot line (305) 451-1381

Key Largo Diving Headquarters  
Reef Trips-Air-Rentals-Dorms-Motel-  
Group Rates-Cay Sal & Bahama Trips-  
24 hour hot line. Rt. #1, Box 293, Key  
Largo, FL 33037 (305) 451-1151

Key West Pro Dive Shop, Inc.  
"Key West's Oldest Dive Shop"  
1605 N. Roosevelt Blvd., Key West, FL  
33040 (305) 296-3823

Pioneers Dive Center  
"Specializing In Dive Adventures"  
At the Hilton Haven Hotel. P.O. Box  
333, Key West, FL 33040 (305) 296-6925

Island Dive Shop  
"Key West's Oldest Dive Captain"  
Captain Mike Wilbur. 1990 N. Roosevelt  
Blvd., Key West, FL 33304  
(305) 294-6376

Diver's World, Inc.  
On Florida's West Coast  
57' Charter Dive Boat-PADI Inst.  
13613 Gulf Blvd., Madeira Beach, FL  
33708 (813) 392-8978

The Diving Site Pro Dive Shop  
Daily Reef Trips. Half day w/2 dives \$15.  
Sales-Rentals-Repairs-Hydro Testing.  
Charter rates available. 40' and 28' dive  
boats. Master Charge and Bank  
Americard. 12565 Overseas Hwy.,  
Marathon, FL 33050 (305) 289-1021

Diver's Den South  
Sales-Service-Rentals-Trips-PADI-NAUI-  
YMCA Inst. 12614 N. Kendall Dr.,  
Miami, FL 33186 (305) 595-2010

The Diving Locker  
295 Sunny Isles Blvd.  
N. Miami Beach, FL 33160  
(305) 947-6025

Pisces Divers, Inc.  
Your full service dive facility in North  
Dade-Service-Sales-Trips-The best of  
instruction. 14328 Biscayne Blvd.,  
N. Miami Beach, FL 33181  
(305) 944-2310

Sport Diver

Matheny's Aquatics Unlimited  
Host to Fla. Springs/Bahamas. Scuba-  
pro-Dacor-Swimaster-Stag-NASDS-  
YMCA-NAUI-PADI-Facility.  
556 Kingsley Ave., Orange Park, FL  
32073 (904) 264-3357

Hal Watt's Aquatic & Trail Center, Inc.  
Instr.-Sales-Rentals-Repair-Guides-Back  
Packing-Hiking-Complete Health Spa.  
2000 N. Mills Ave., Orlando, FL 32807  
(305) 896-4541

Diver's Den  
NAUI-PADI-YMCA Inst.-Dacor-Air 3500  
psi-Trips-Rental-Sales-Service.  
4700 E. Hwy. 98, Box 10606, Panama  
City, FL 32401 (904) 769-1321

## GEORGIA

Diving World USA  
Largest Dive Shop in GA-All brands-  
GA's Recompression Chamber (3 man)-  
YMCA Classes-Rental-Repair.  
2945 Buford Hwy. N.E., Atlanta, GA  
30329 (404) 634-4354

Dive and Leisure Sports  
PADI Training Facility-Monthly Dive  
Trips. 3365 Main Street, College Park,  
GA 30337 (404) 767-1815

Aqua Shop Diving School  
Full service dive shop-Charter boat-  
Basic & Advanced Classes-U/W  
Photography. 131 E. Montgomery Cross  
Rds., Savannah, GA 31406  
(912) 354-8767

Sub-Aqua Specialties  
Sales-Service-Rentals-PADI Inst.-Heated  
Pool-5000 psi Air-Fla. Diving Info.  
2236 Bemis Rd., Valdosta, GA 31601  
(912) 242-1152

## HAWAII

South Seas Aquatics  
1125 Ala Moana Blvd.  
Honolulu, Hawaii 96814  
(808) 538-3854

Aaron's Dive Shop  
We Dive the BEST Spots on Oahu-  
Private Instruction Available  
39 Malunui Ave., Kailua, HI 96734  
(808) 261-1211

Central Pacific Divers  
Daily Charters to the Best Diving on a  
choice of 6 islands-Sales-Charters-Instr.  
780 Front St., Lahaina Mani, HI 96761  
74-5484 Kaiwi St., Kailua Kona, HI  
96740

Hawaiian Divers  
The Experts in Kona  
Charters-Air-Gear  
Box 572, Kailua Kona, HI 96740  
(808) 329-3407

Aloha Dive Shop  
"Gateway to Hanauma Bay"  
Retail Sales-Service-Air-Rentals-  
Charters- Boat & Shore Dives-Inst.  
Koko Marina, Hawaii Kai, HI 96825  
(808) 395-5922

Sea Sage Unlimited  
"Kauai's Only Complete Pro Dive Ctrs."  
Just a 15 min. drive from any hotel. Out  
of the ordinary? So are we!  
4544 Kukui St., Kapaa, HI 822-3841 and  
Poipu 742-1262

Garden Island Marine Lihue, Kauai  
Fantastic Diving-NAUI-PADI cert.-Scuba  
Charters-Boat Dives-Instruction-Fishing  
Charters. R.R. #1, Box 180 B, Lihue, HI  
96766 (808) 245-6361

Dan's Dive Shop, Inc.  
"The Best on Oahu"-Daily dive tours-  
Complete dive center for novice/pro-  
5 day certification course.  
1382 Makaloa, Honolulu, HI 96814  
(808) 941-2284

## ILLINOIS

Academy Aqua Sports Dist. Ltd.  
Air-Sales-Service-Instruction  
2838 Chicago Rd., S. Chicago Hts., IL  
60411 (312) 756-4334

Underseas Scuba Center  
Sales-Service-Instruction-Trips  
226 South Main St., Lombard, IL 60148  
(312) 629-2534

Midwest Diving Specialists, Inc.  
Dacor-Global-Ikelite-Imperial-Poseidon-  
White Stag-PADI Inst.-Air.  
203 S. Linden, Normal, IL 61761  
(309) 452-0222

## KANSAS

Topeka Dive Shop  
NAUI-PADI-Air-Tours  
Stauky Marina on Beaver Lake  
Arkansas. 1425 Lane, Topeka, Kansas  
66604 (913) 357-4895

## KENTUCKY

Lexington Dive Shop, Inc.  
Everything in diving.  
819 Euclid Ave., Lexington, KY 40502  
(606) 266-4703

## LOUISIANA

Harry's Dive Shop, Inc.  
Skin-Scuba-Commercial Equip-Sales-  
Service-Repairs-Airfills-USCG Cert. Dive  
Boat. 4709 Airline Hwy., Metairie, LA  
70001 (504) 888-4882



## MARYLAND

Diver's Den, Inc.  
Sales-Service-Air-Rentals-Inst.-Boat  
Trips-Tours-Metal Detectors.  
8105 Hartford Rd., Baltimore, MD 21234  
(301) 668-6866

## MASSACHUSETTS

Al's Rod & Gun Shop  
Professional Service-Sales-Air-  
Instruction-Hydros. We are the best!  
400 Broadway, Rt. 28, Lawrence, Mass.  
01841 (617) 683-0310

## MICHIGAN

Seaway Diving Centers  
"Great Lakes Divers Headquarters"  
Classes-Rental-3000 Air-Repairs.  
26550 Grand River, Detroit, Mi. 48240  
(313) 255-0850; 24520 Harper,  
St. Clair Shores, MI 779-2570

Scuba North, Inc.  
Charters-Service-Air 5000-Hydro test-  
Whsl.-NAUI-PADI Inst.-Compressors-  
Wind surfers-Boats-Sailboat Rentals &  
Charters. 13258 W. Bayshore Dr.,  
Traverse City, MI 49684 (616) 947-2520

## MINNESOTA

Club Scuba, Inc.  
#1 1300 E. Wayzata Blvd., Wayzata, MN  
55391 (612) 473-4266  
#2 2280 Maplewood Dr., Maplewood,  
MN 55109 (612) 484-7252

Inter-Space U.W. Photos  
Lake Superior Charters, 6060 5th St., N.E.  
Minneapolis, MN 55432  
(612) 571-9003

The Argonauts, Inc.  
NAUI-PADI-All lines-Charter lake/sea-  
5000 psi. 1040 University Ave.,  
St. Paul, MN 55104 (612) 645-0831

## MISSOURI

Skin-N-Scuba Dive Shop, Inc.  
Sales-Service-Rentals-Instruction-Heated  
Pool-PADI Training Facility.  
1300 W. 40 Highway, Blue Springs, MO  
64015 (816) 229-0855

Hughes Dive Company  
Sales-Service-Air-Rentals-Trips-  
Instruction-PADI & SSI-Visual  
Inspection-Hydros. 437 Broadway, Cape  
Girardeau, MO 63701 (314) 335-0756

West End Diving Centers, Inc.  
Retail-Whsl-Repairs-Comprs-Instr.-Air  
5000. 11004 Manchester, St. Louis, MO  
63122 (314) 822-3005  
11215 Nat. Bridge Rd., St. Louis, MO  
63044 (314) 731-5003

## NEW HAMPSHIRE

Atlantic Aquasport  
5000 PSI Air-Rentals-Repairs-NASDS-  
NAUI-PADI Inst.-Factory trained Unisuit  
repairs. 522 Sagamore Rd., Rye, NH  
03870 (603) 436-4443

## NEW JERSEY

Innerspace Divers of Long Beach Island  
So. Jersey's Only Complete, Full Time  
Dive Shop. Open 7 days a week year  
round. 2805 Long Beach Blvd., Beach  
Haven Gardens, NJ 08008  
(609) 492-0982

The Edison Skin Diving Center  
NASDS-YMCA-PADI-NAUI Inst.-  
Scubapro-Bayley-Watergill Atpac-  
Imperial-Dacor-Unisuit Sales-All other  
brands. 1659 Hwy. 27, Edison, NJ 08817  
(201) 985-2206

Lakeland Divers, Inc.  
YMCA-NAUI-PADI-"The Full Service  
Dive Shop"-Indoor heated pool on  
premises. 92 Route 10, East Hanover,  
NJ 07936 (201) 887-0194

Diver's Cove  
The full service dive shop that cares.  
Personalized open water inst.-Diving  
vacations-Boat Charters. Hwy. 35,  
Laurence Harbor, NJ 08879  
(201) 583-2717

The Dive Shop of New Jersey  
Scuba Diving Inst.-NAUI-YMCA-Boat  
Trips-Sales-Service-Air Fills-Open all  
year. 118 N. Main, Pleasantville, NJ  
08232 (609) 646-1008

4 Divers, Inc.  
Refills-Repairs-Rentals-Recovery-Salvage-  
PADI-YMCA. 56 Broadway,  
Pt. Pleasant Bch., NJ 08742  
(201) 899-7753

Princeton Aqua Sports  
YMCA/NAUI/PADI Inst.-Air-Sales-  
Rentals-Repairs-Hydros VIP-Wreck  
Dives/Tours. 306 Alexander, Princeton,  
NJ 08540 (609) 924-4240

Marlin Scuba  
Air-Sales-Rentals-Repairs-Indoor Heated  
Pool-PADI-YMCA-British Sub Aqua  
Inst. 506 Route 17, Ramsey, NJ 07446  
(201) 327-6000

## NEW MEXICO

Albuquerque Divers Den  
PADI-NAUI-Training-Sales & Service-  
Complete 5000 psi air station.  
1741 Juan Tabo N.E., Albuquerque, NM  
87112 (505) 294-1886

Watersports  
PADI, SSI Instruction-Dacor-Swimaster-  
SAS. 5009 Menaul N.E., Albuquerque,  
NM 87110 (505) 266-5218

## NEW YORK

The Dive Shop, Inc.  
68' Dive Vessel-Indoor Pool-Rentals-  
Repairs-Hydros-Air \$1-Open 7 days-  
NAUI-PADI-YMCA Inst. 110 W. Main  
St., Bay Shore, NY 11706  
(516) 665-2526

Cougar Sports, Inc.  
Full service pro shop. Inst.-Sales-Tours-  
Trips. 590 Central Park Ave., Scarsdale,  
NY 10583 (914) 472-9494  
3490 Webster Ave., Bronx, NY 10467  
(212) 881-5636

Kings County Divers Corp.  
Brooklyn's Full Service Pro Shop.  
Authorized Scubapro Dealer.  
3040 Avenue U, Brooklyn, NY 11229  
(212) 648-9897

Niagara Scuba Sports, Inc.  
Local Charters-Tours-Sales-Rentals-  
Tank testing-Certified Air-PADI-SSI-  
YMCA Inst. 2048 Niagara St.,  
Buffalo, NY 14207 (716) 875-6529

World Wide Divers  
Scuba Inst.-U/W Photo Equip-Sales-  
Travel. Bonaire's Aquaventure &  
Habitat, Bermuda, Cozumel, Cayman,  
the World. 155 E. 55th St., New York,  
NY 10022 (212) 688-2510

## NORTH CAROLINA

Blue Dolphin Dive Shop, Inc.  
PADI Training Facility S-202  
2510 English Road, High Point, NC  
27260 (919) 882-9726

## OHIO

Diver's Paradise  
Toledo's Oldest Pro Dive Shop  
Basic & Advanced Inst.-Air-Sales-Service-  
Rental-Dive Trips. 2511 N. Reynolds,  
Toledo, OH 43615 (419) 535-6828

Underwater Sports of Ohio  
PADI-YMCA Instruction-Air-Sales-  
Service-Rentals. 703 S. Main Street,  
Urbana, OH 43078 (513) 653-5741

## PENNSYLVANIA

Weber's Dive Shop, Inc.  
Open M-T-T-F 6:00-9:00, Sat. 9-12 & 6-8  
Auth. Scubapro Dealer, 153 State St.,  
Baden, PA 15005 (412) 869-7972 or  
(412) 266-6834



Atlantis Diving Center  
2 PM to 8 PM-Closed Mondays  
4363 Main Street, Manayunk,  
Philadelphia, PA 19127  
(215) IV3-8650

The Diving Bell, Inc.  
Open Tuesday thru Saturday-Free  
parking on two lots. 681 N. Broad St.,  
Philadelphia, PA 19123 (215) 763-6868

York Skin Diver's Supply, Inc.  
Instruction-Sales-Rentals-Air-Service-  
Commercial Diving. 1505 S. George St.,  
York, PA 17403 (717) 854-3133

## TENNESSEE

Neptune Equipment Corporation  
"Your Complete Dive Shop"  
2608A Franklin Pike, Nashville, TN  
37204 (315) 383-8565

## TEXAS

Skindiving Schools of Fort Worth  
Divers Equip. & Sup.-Pure Air-Sales-  
Serv.-Repair-Rentals-Dvg Systems-  
Resort Travel-Salv. 3807 S.W. Blvd.,  
Ft. Worth, TX 76116 (817) 732-5761

Diver's World, Inc. (N. Dallas)  
Major brands-Sales-Service-Trips-  
Rentals-Cameras-NAUI Inst.-Zodiac  
Inflatable Boats. 632 S. Central Exprwy.  
Richardson, TX 75080 (214) 231-7865

## VERMONT

Northern Divers, Inc.  
"A Professional Dive Shop"-NAUI Inst.-  
Sales-Rental-Repair-Commercial.  
Burlington, VT (802) 862-3881;  
St. Albans, VT (802) 524-4097

## VIRGINIA

Dad's Dive Den  
Equipment Rentals-3000 Air Fills-  
Repairs-Testing-Inst. RFD 2, Box 211  
Charlottesville, VA 22901  
(804) 296-1319

## WASHINGTON

Silent World Divers, Inc.  
Travel with NASDS Professionals. Inst.-  
Equipment-Service. 14444 S.E. Eastgate  
Way, Bellevue, WA 98007  
(206) 747-8842

## WISCONSIN

Fontana Army-Navy Store, Inc.  
Air-Instruction-Sales-Rentals-PADI  
Training Facility. Hwy. 67, Fontana,  
Wis. 53125 (414) 275-2220

## AUSTRALIA

Cairns Barrier Reef Divers  
Sales-Service-Air-Equip.-Rentals-Diving  
Inst.-Super Dive Trips! 47 Shield St.,  
Cairns, Australia 4870 Aust. (70) 511889

Heron Island Dive Shop  
Complete Barrier Reef Dive Facility.  
Trips-Air-Sales-PADI Instruction  
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Australia, 781488 Telex 49455

## BAHAMAS

Underwater Explorers Society  
(UNEXSO) World Famous Facility!  
Blue Holes-18' deep pool-Photo lab-  
Chamber. Box F2433, Freeport,  
Bahamas, (809) 373-1244

## CANADA

Scubanautique Limited  
NASDS-Full Service Pro Store/School-  
Scubapro & other major brands-Carib  
tours-Photography by Allen W. Bruce.  
5791 Tecumseh Rd. E., Windsor  
Ontario, Can. N8T 1E1 (519) 948-7171

Points West Diving Ltd.  
1073 Roosevelt Cresnet  
North Vancouver, B.C. V7P 1M4  
(604) 980-6501

## MEXICO

Galapago-Inn Dive Resort  
New Divers Headquarters in Mex-  
Caribbean-Full SCUBA, U/W Photo-  
Trips & Group Pkgs.; P.O. Box 289,  
Cozumel, Q. Roo, Mexico; Ph. 20627

## PHILIPPINES

Aquaventure Phils., Inc.  
Dive Resort/Tours\* Equip. Sales-  
Repairs-Air-PADI Inst. #1 Space 701,  
Aurora Blvd., Quezon City, Philippines;  
#2 908 Pasay Rd., Makati, Rizal,  
Philippines T-79-86-48

## VIRGIN ISLANDS

Caribbean Divers  
Dive & Snorkel Tours by Boat-Inst.-  
Sales-Service-Rental-Group Rates-  
Accommodations-Fresh Air-Red Hook,  
St. Thomas, Virgin Islands 00801  
(809) 775-1935

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V.I.'s Most Complete Diving Facility  
Tours & Classes for Beginners &  
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U.S.V.I. 00801 (809) 774-8687

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## ANNOUNCES

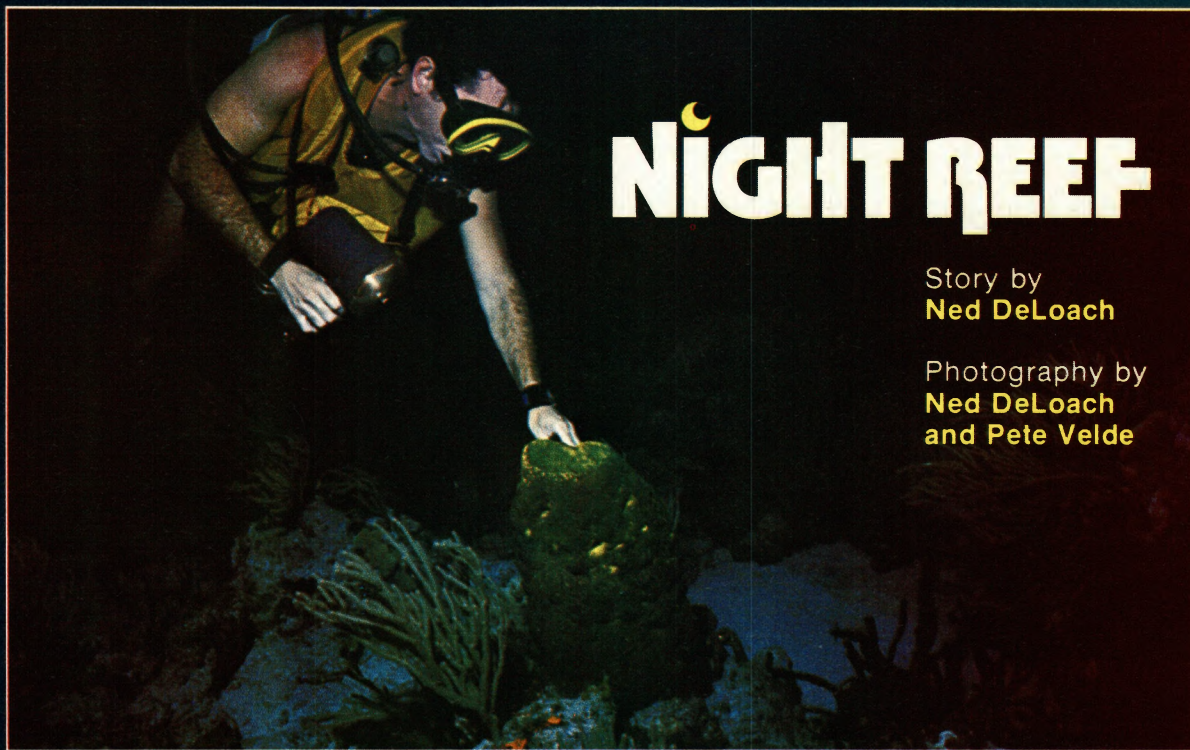
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## A TOLL FREE ORDERING NUMBER



## AVAILABLE JUNE '78





# NIGHT REEF

Story by  
**Ned DeLoach**

Photography by  
**Ned DeLoach  
and Pete Velde**

To love the natural beauty and wonder of our planet is to be filled with life. Those of us addicted to life and nature backpack through the mountains, canoe down streams, or dive the oceans in a relentless effort to satisfy our instinctive fascinations. The splendor of a living coral reef is a fairyland for our enthusiasm with its panoramas of varied shapes and colors. Centuries of growth have created an environment that houses a myriad of sea life ranging from minute coral polyps to large grouper and jewfish.

As divers most of us became acquainted with the reef during daylight hours, when thousands of colorful



*After dark, the colors of a basket sponge glow intensely under the bright beam of a dive light (above), and a stone crab prowls the reef for food.*

tropicals dance around the coral heads and schools of larger fish weave slowly through the sponges and waving gorgonia. We are astounded by the prolific and varied types of life that inhabit the reef and delight in each minute we can spend roaming over and around the sea garden. Too often our visit ends before dusk and we head back in to rest for the next day of diving,

unaware of the spectacular metamorphosis of life that is about to unfold on the reef.

Sundown signals retreat for the sea creatures of the day. They instinctively seek out the inner crevices and undercuts of the reef, while a multitude of sea life which evaded our careful search by day, emerges in the darkness to begin the odyssey of the night reef. After darkness settles in, the reef

once again comes to life with a new cast of characters, each as interesting and beautiful as any that amused us during our daylight dives.

On our first dive after dark we settle to the bottom, our attention focused on the narrow hand light beam as it cuts through the darkness. The light brings out vivid patterns of color on the reef that were lost to us by day. Moving in closer to a coral head, we see for





the first time thousands of tiny coral polyps blooming from their homemade limestone encasements to filter seawater for planktonic food. A short distance away a delicately structured basket star catches our eye as it spreads its arms within the branches of a sea plume. Lobsters and crabs can be seen as they prowl the fringes of an outcropping for food. While swimming down the reef line we catch the movement of a shy octopus slipping out of his den under the protection of night. On the side of a nearby basket sponge a pair of red and white striped barber shrimp bounce comically. Under the protection of a rock ledge we spot our first denizen of



*While this colorful tropical sleeps (above), a diver searches for some of the many small night creatures that hide among the basket-stars (left) and sponges (below).*

the day, a large scrawled filefish. Surprisingly, we can swim right up to the sleeping fish and study the beautiful iridescent bluish green patterns of its thin body without disturbing its rest.

Before our dive ends, we turn off the lights to see hundreds of phosphorescent plankton glitter around us; bright

stars in a salty sky. After our eyes become accustomed to the dimness, we can see the dark outline of the reef, and, straight above, the silhouette of our dive boat against the moonlight. Feeling at peace and fulfilled, we slowly ascend and end our fascinating visit, leaving behind our new world, the night reef. ☸



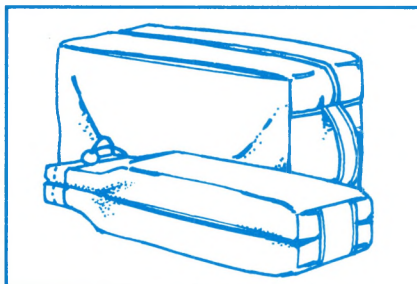
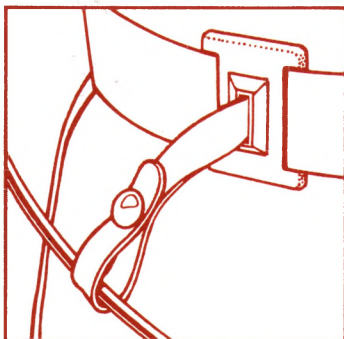


# Go down with a splash of color

Pennform Universal Instrument Consoles are made to fit your existing gauge system. Let us add some dash to your splash by housing your instruments in practical, colorful, high impact polypropylene. These precision-cut

housings are available in Blue, Black, Red, Yellow and Green. Beautifully designed, they fit perfectly around nearly all of the finest gauges available, in your personal combination. ☐ Our rugged 200, 300 and 320 series consoles are constructed in two pieces for

The Console Retainer Strap is designed to hold one or two hoses, for use with all console systems, or with pressure gauges alone. Its colors are perfectly matched to our own consoles.



easy assembly. Simply place your gauges in the pre-cut bottom and screw on the cover. It couldn't be easier! ☐ Pennform also offers the perfect companion to your instrument console. Our easy to read Console Slate is made to be attached out of your way, to the back of your Pennform Console. The pencil fits securely along the side of the slate, with no excess tubing, furnishing maximum efficiency. ☐ The Pennform Console System

is the answer in eliminating bulky, excess equipment.

Protect your valuable instruments with our Console Bag in five matching colors, or combination Console and Regulator Bag in Blue or Black.

C-2227 Optional Slate

C-3127 Optional Slate

200 Series

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300 Series

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320 Series



## THE INNOVATORS

# Dacor Precision Instrumentation

The diver today wants accurate information which can only be provided by precision instrumentation. When it comes to measuring depth, time, tank pressure, and finding direction underwater, Dacor's got it all in the convenient form to provide you with the accuracy and versatility you need on every dive.

### DEPTH GAUGES & COM-

**PASSES MDI150**—Maximum Depth Indicator Gauge records the deepest point of the dive, reads to 150 feet. **MDI300**—Same as MDI150 but reads to 300 feet. **LFG150**—2" phosphorescent dial for maximum readability, reads to 150 feet.

**LFG300**—Same as LFG150 but reads to 300



### DACOR CORPORATION

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includes '78 catalog,  
cloth patch,  
decomp. table, decals.

feet. **SFG150**—1 1/4" silver dial with large, easy to read numbers. Reads to 150 feet. **SFG300**—Same as SFG150 but reads to 300 feet. **LCG**—Capillary depth meter, reads to 250 feet. **MCG**—Metric capillary depth meter, reads to 80 meters. **DCP**—Oil filled navigation compass. **WC**—Watch band compass. **WTO**—Watch band thermometer, reads to 120° F. **WTM**—Watch band thermometer, reads to 45°C. **WGC**—Watch band capillary gauge, reads to 150 feet. **WGM**—Metric watch band capillary gauge, reads to 45 meters.

**WATCHES UWM1**—Men's Quartz Movement Electronic Time Machine, pressure tested to 100 ATMS (3,300 feet). **UWM2**—Men's Automatic Dive Watch, pressure tested to 25 ATMS (825 feet). **UWL1**—Women's Automatic Dive Watch, pressure tested to 30 ATMS (990

feet). **CONSOLES ICM150**—Console with TAG and MDI150. **ICM300**—Console with TAG and MDI300. **ICL150**—Console with TAG and LFG150. **ICL300**—Console with TAG and LFG300. **ICS150**—Console with TAG and SFG150. **ICS300**—Console with TAG AND SFG300. **TAG**—Underwater pressure gauge, reads to 3500 p.s.i. **CTG**—Combo with TAG and LCG capillary gauge. **MTG**—Combo with TAG and MCG capillary gauge.

